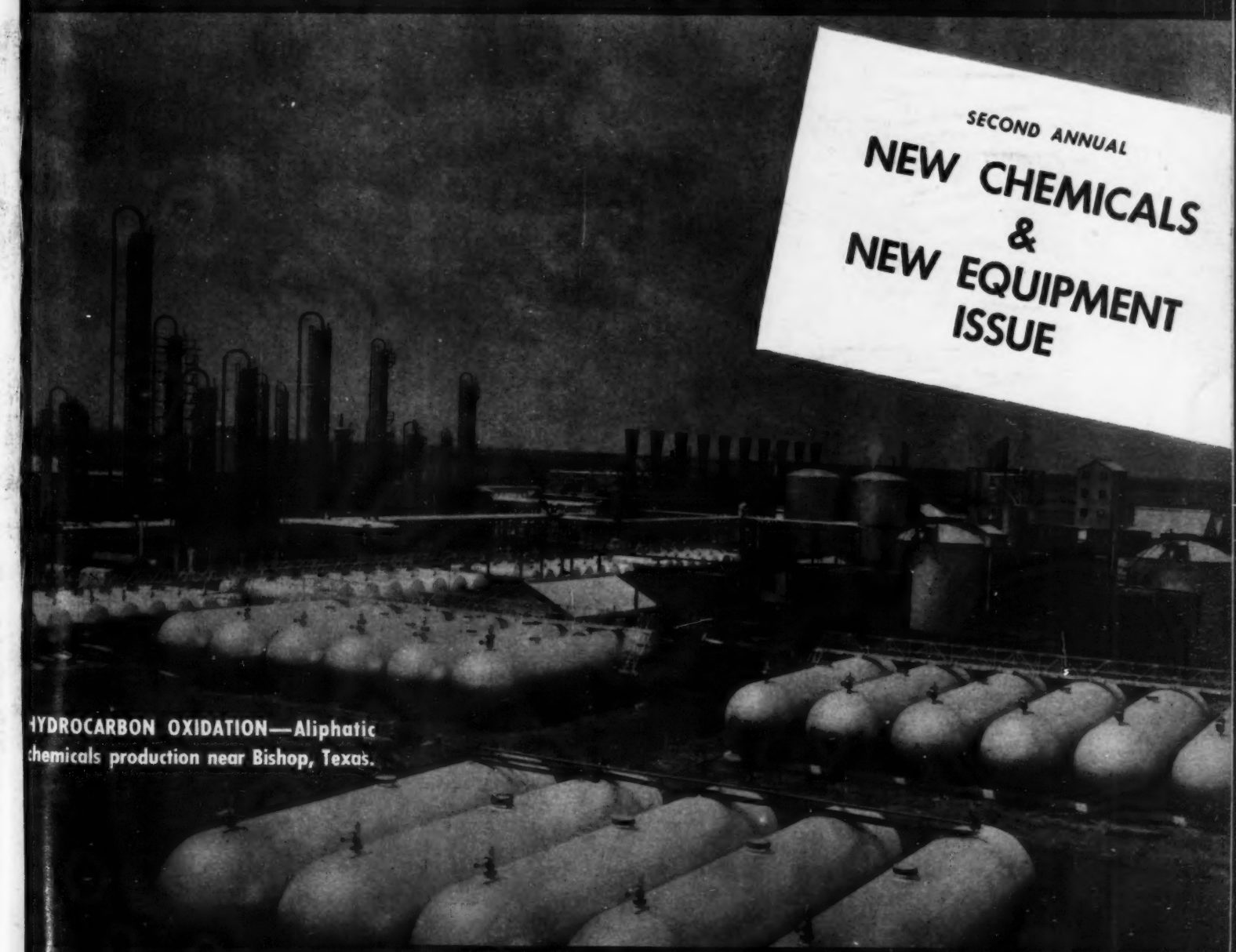
ugust 1946

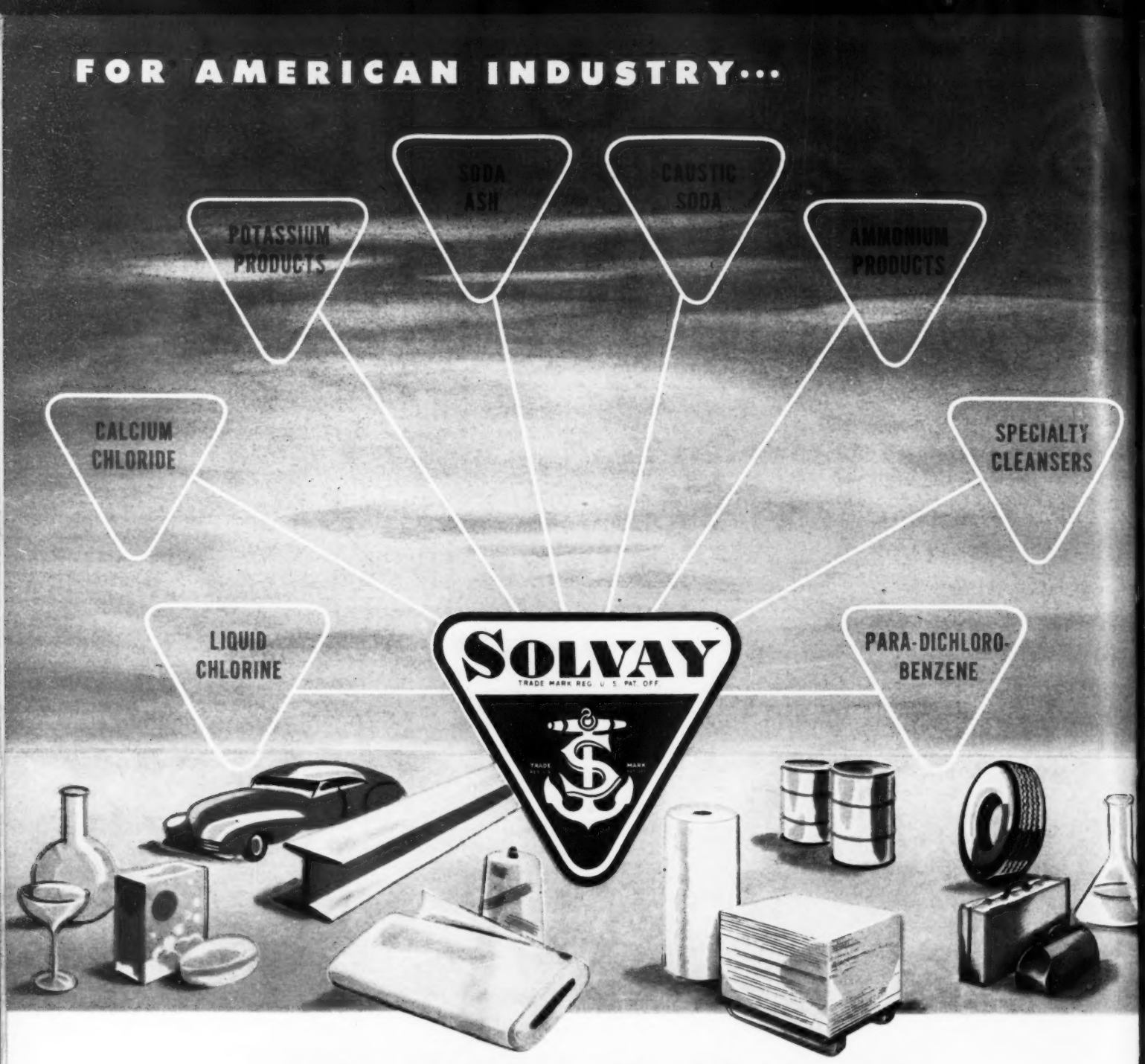
Chemical Industries

IN THIS ISSUE



HYDROCARBON OXIDATION—Aliphatic chemicals production near Bishop, Texas.

Backdrop of change p. 255



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PROPERTIES	
Molecular Weight	80.92
Boiling Point, °C	126.
Specific Gravity at 25/4°C	1.48
Rate of change of Specific Gravity, per °C	—0.00075

TYPICAL COMPOSITION RANGE	
Specific Gravity at 25/4°C	1.476 to 1.484
Residue, wt. %	<0.005
Hydrogen Bromide, wt. %	47.5 to 48.5
Color, % light transmission	>80

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Glass-Stoppered Boxed Carboys	
5 gallons	55 lb., net wt.
13 gallons	150 lb., net wt.

Remarkably free from impurities, our new large-scale production of Hydrobromic Acid Aqueous 48% has been made possible by equipment and processes developed incidental to important wartime chemical contracts.

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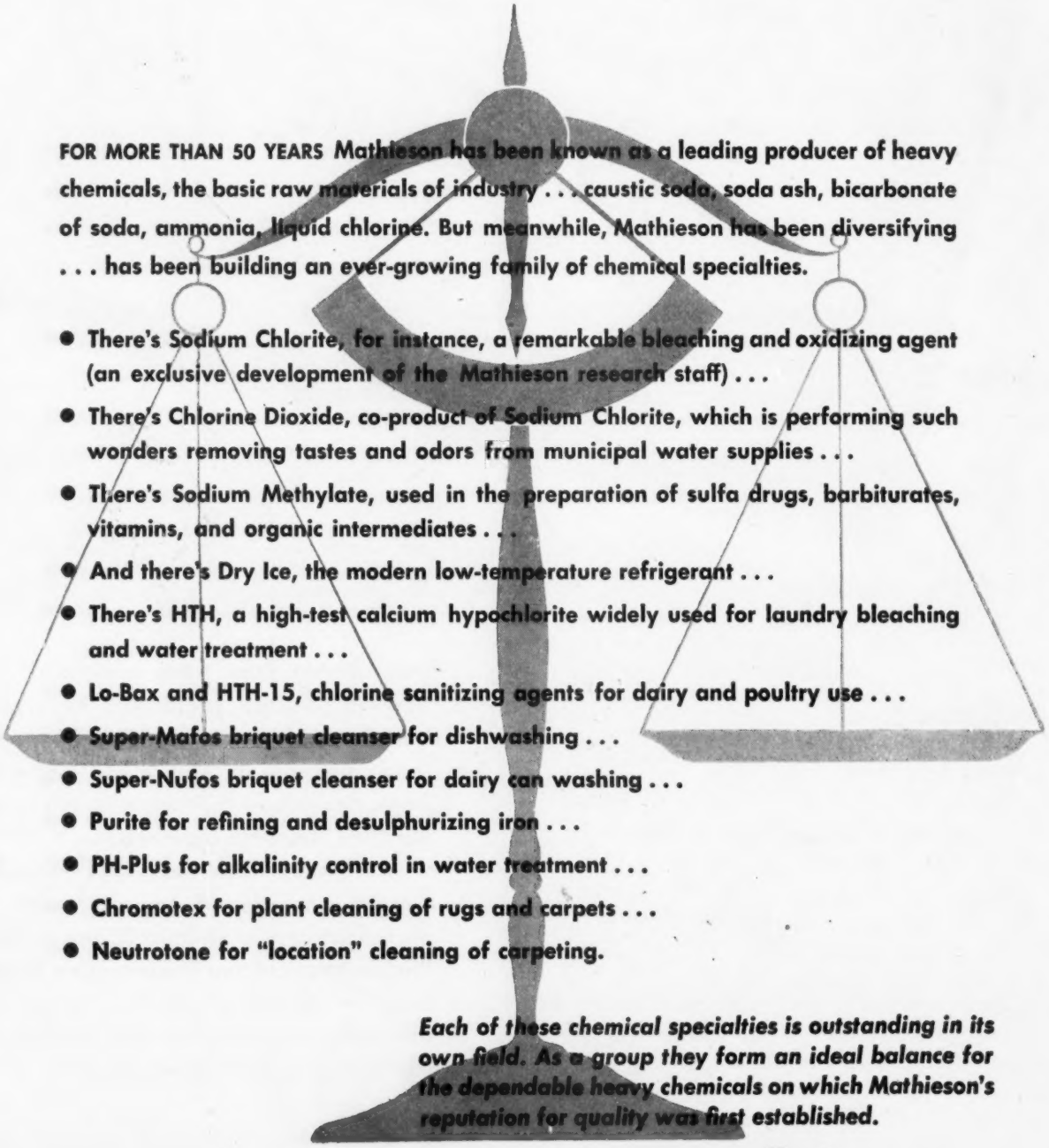
CHEMICAL BALANCE



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- There's Sodium Methylate, used in the preparation of sulfa drugs, barbiturates, vitamins, and organic intermediates . . .
- And there's Dry Ice, the modern low-temperature refrigerant . . .
- There's HTH, a high-test calcium hypochlorite widely used for laundry bleaching and water treatment . . .
- Lo-Bax and HTH-15, chlorine sanitizing agents for dairy and poultry use . . .
- Super-Mafos briquet cleanser for dishwashing . . .
- Super-Nufos briquet cleanser for dairy can washing . . .
- Purite for refining and desulphurizing iron . . .
- PH-Plus for alkalinity control in water treatment . . .
- Chromotex for plant cleaning of rugs and carpets . . .
- Neutrotone for "location" cleaning of carpeting.

Each of these chemical specialties is outstanding in its own field. As a group they form an ideal balance for the dependable heavy chemicals on which Mathieson's reputation for quality was first established.

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THE CHEMICAL BUSINESS MAGAZINE

Chemical Industries

VOLUME 59
NUMBER 2

August 1946 Contents

DEPARTMENTS

NEWS OF THE MONTH

COVER: General view of the Celanese Corp. of America's chemical plant at Chemcel, near Bishop, Texas, showing butane and propane storage tanks in the foreground and fractionating towers in the background.

Published monthly, except twice in November, at 1309 Noble St., Philadelphia 23, Pa., and entered as 2nd class matter July 15, 1944, at the Post Office at Philadelphia 4, Pa., under the Act of March 3, 1879. Subscription $4 a year, $6 for two years. Add $2 per year for postage to foreign countries other than Canada and Latin America. Single copies 50c, except November. Canadian subscriptions and remittances may be sent in Canadian funds to Chemical Industries, P. O. Box 100, Terminal A, Toronto, Canada. Office of Publication: 1309 Noble Street, Philadelphia 23, Pa.
EDITORIAL & EXECUTIVE OFFICES: 522 FIFTH AVE., NEW YORK 18, Murray Hill 2-7888. DISTRICT OFFICES: Chicago: 309 West Jackson Boulevard, Chicago 6, Ill., Harrison 7890. Los Angeles: 816 West Fifth Street, Los Angeles 13, Calif., Mutual 8512. San Francisco: 68 Post St., San Francisco 4, Calif., Yukon 1069. London: Quadrant House, 55, Pall Mall, London, S. W. 1., England.
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THE READER WRITES

Political Scientists

To the Editor of Chemical Industries

I want to register a strong protest against Mr. W. Alec Jordan's editorial in the May issue. If every other labor, religious and managerial organization in the nation can engage in politics, why shouldn't scientists—all scientists—organize for the same purpose. If anything shows political immaturity on the part of scientists, it would be their failure to become well organized.

G. L. PUTNAM
9533 Tompkins Avenue
Niagara Falls, New York

Mr. Jordan's editorial was not against organization. Rather it was intended as a warning against the dangers of having a number of organizations, some of rather questionable sympathies and affiliations, all purporting to speak for "the scientist". —EDITOR

Christmas Islands Phosphate

To the Editor of Chemical Industries:

On page 990 of the June 1946 issue of CHEMICAL INDUSTRIES reference is made to Christmas Island, in which it is stated that: "American interests are seeking Christmas and Funafuti along with the Canton Islands, as a part of a Pacific defense pattern evolved by U. S. Military and Naval strategists." Also, it is inferred that this same Christmas Island has very rich deposits of phosphate rock from which much phosphate was shipped to Australia, New Zealand, and Japan in prewar years.

I should like to point out that there are two islands which bear the name Christmas. The one in the Central Pacific, which is of interest as a defense outpost for the United States, has or did have some deposits of guano. The record indicates, however, that these deposits were of only minor importance and that they have been worked but little, if at all, since 1900.

The other Christmas Island is in the Indian Ocean in latitude 10 degrees 25 minutes South and longitude 105 degrees 43 minutes East, about 200 miles south of Java. It is this island that has the important deposits of phosphate rock, which have been worked by a British company since 1897. I believe there is no question of the British sovereignty over this island, and that it has no interest to the United States, either as a defense outpost or as a source of phosphate rock. The island was occupied by the Japanese but is again in the hands of the British company, and rehabilitation of the phosphate rock industry is proceeding rapidly. In prewar years the rock was shipped chiefly to Japan, but it will now go mostly to Australia and New Zealand, at least until full production from the Nauru and Ocean Island deposits can be re-established.

K. D. JACOB,
Principal Chemist,
Division of Soils, Fertilizers and Irrigation,
U. S. Department of Agriculture,
Beltsville, Maryland.

Our thanks to Mr. Jacob for correcting our oversight, and pointing out so clearly the fact that two Christmas Islands exist, quite different in character.—EDITOR

Market Research Series

To the Editor of Chemical Industries

I have been following with a great deal of interest the series of articles by Dick Lawrence on sources of Market Research Data.

In our industry, such information is often exceedingly difficult to locate. I feel that you should be commended for the contribution these articles are making.

LAWRENCE C. LOCKLEY,
Manager,
Market Research Division,
E. I. du Pont de Nemours & Co., Inc.

We appreciate Mr. Lockley's comments and are pleased to report that publication of Mr. Lawrence's articles will be resumed next month.—EDITOR

South African Visitors

To the Editor of Chemical Industries

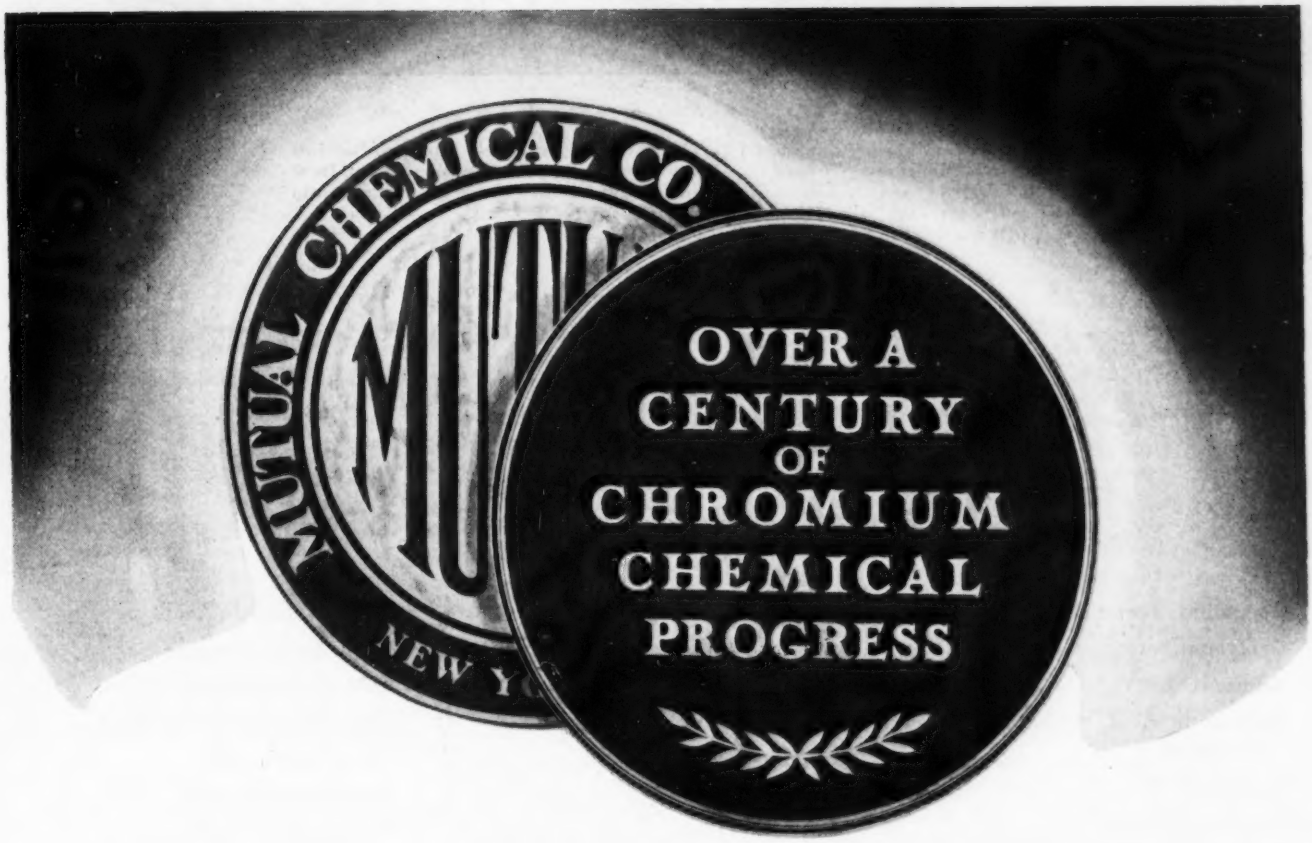
One of our experts will shortly be going to the U. S. A. to conduct negotiations with various American factories to effect arrangements whereby we may represent selected chemical producers in this country.

We have been studying your various articles regularly and think that you as publishers of a leading chemical business journal can be of assistance to our representative and will surely be able to give him the addresses of firms who are seeking experienced representatives in South Africa.

We should be very pleased, therefore, if you would give our representative every possible assistance when he arrives in New York.

A. HIRTH,
Inag, Pty. Ltd.,
Box 2306, Capetown.

We are always glad to meet our readers and to render such assistance as is possible.—EDITOR



Beginning Our Second Century of Chromium Chemical Progress

One hundred and one years ago when the predominating features of the sky line of Baltimore were masts and a few steeples, the foundations for the present Mutual Chemical Company of America were being laid there by Isaac Tyson, who built the first chromium chemical plant in this country.

About forty years later Augustus Schultz determined the fundamental principles of two-bath chrome tanning. This process was rapidly adopted, and followed by a one-bath process development.

Since that time interest in chromium chemicals has grown by leaps and bounds until today these compounds play a vital part in industrial life. Important applications include anodizing aluminum, chrome plating, metal cleaning, and corrosion prevention.

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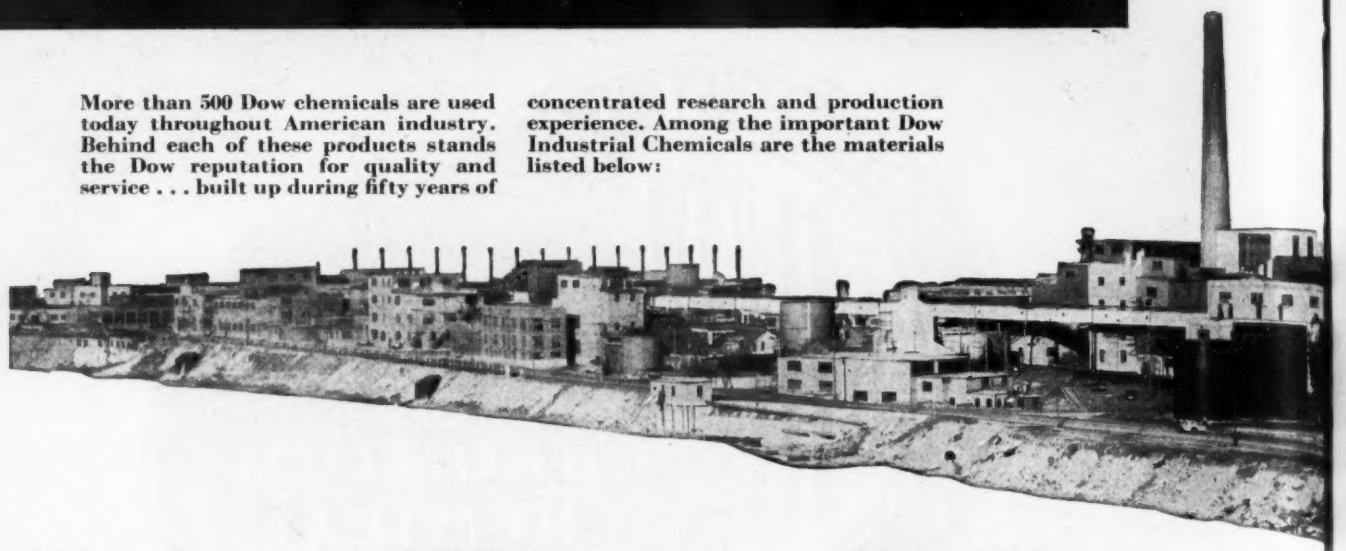

Acetanilid, Technical
Acetylene Tetrabromide
Aniline Oil
Anthranilic Acid, Sublimed and Technical
Bis Phenol-A
Bromacetic Acid
Bromine, Purified
Bromoform, Technical
4-tert-Butyl Catechol
Calcium Chloride, Anhydrous, Flake, Liquid, Powder and Solid
Carbon Bisulphide
Carbon Tetrachloride
Caustic Soda, Flake, Liquid and Solid
Chloracetyl Chloride
Chloroform
Cumene
Dichloracetic Acid
Dichlorethyl Ether
Diethanolamine
Diethylaniline
Diethylene Glycol
Diphenyl
Diphenyl Oxide
Dipropylene Glycol
Dowtherm A
Epsom Salt, U. S. P. and Technical
Ethyl Benzene
Ethyl Chloride
Ethylene Chlorbromide
Ethylene Chlorhydrin
Ethylene Dibromide
Ethylene Dichloride
Ethylene Glycol
Ethylene Oxide
Ethyl Monobromacetate
Ethyl Monochloracetate
Ferric Chloride, Crystals and Solution
Ferrous Chloride, Dihydrate
Hexachlorethane
Hydrobromic Acid
Isopropyl Formate
Magnesium Chloride, Anhydrous, Flake and Powder
Methocel (Dow Methyl Cellulose)
Methyl Bromide
Methyl Chloroform
Methyl Cyclohexane
Methyl Monobromacetate
Methyl Monochloracetate
Methylene Chloride
Mining Salts
Monobrombenzene
Monochloracetic Acid
Monochlorbenzene
Monoethanolamine
Orthochlorphenol
Orthocresotinic Acid
Orthodichlorbenzene
Orthophenylphenol
Parachlor Orthonitraniline
Parachlorphenol
Paradibrombenzene
Paraphenylphenol
Para Tertiary Butyl Phenol
Perchlorethylene
Phenol
Phenol Sulfonic Acid
Phenyl Acetate
Phenyl Hydrazine
Phenyl Methyl Pyrazolone
Phthalimide
Propylene Dichloride
Propylene Glycol
Propylene Oxide
Sodium Sulphide
Styrene
Sulphur Chloride, Yellow
Sulphur Monochloride
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WASHINGTON

T. N. SANDIFER *reporting*

Block TVA . . . Minimum Wage Bill . . . Chemical Shortages Fertilizer Controls . . . DDT Requirements . . . Coconut Oil Tax

TVA's Phosphate Plant at Mobile Blocked

A HOUSE VOTE blocked an attempt by interested Senators to attach a $3,000,000 appropriation for construction of a government superphosphate plant at Mobile, Ala., to an extraneous bill. When the Government Corporations appropriation bill reached House consideration, this rider was rejected, sending the amendment back to the Senate, where it was expected the plan would again be sidetracked.

This proposal was before the House in 1942, and initially called for an appropriation of $7,300,000 for the plant. It was classed as a war measure. Last year the appropriation was attached to the Independent Offices bill, and again rejected.

Politically, support for the Government fertilizer plant appears to be centered in midwestern areas, on the ground that high-test fertilizer of the type which the Government says it will make, is seriously short in that section, and fertilizers made elsewhere bear an unduly high freight charge.

Figures were cited during debate on the bill, to show that certain midwestern states use a disproportionately low amount of fertilizers compared with use in the Southeastern states. The reason assigned was that freight rates made it prohibitive to use larger amounts.

An opponent of the Government project, Rep. Dirksen, Rep., Ill., offered to introduce a resolution providing that after a stated date no fertilizer could be shipped in interstate commerce with more than a stipulated percent of inert materials. It was also recalled that the House Agriculture Committee has had for some months a bill to fix a national fertilizer policy, on which no hearings have been held, and no move made for further consideration.

Opposition to the Mobile plant centered on demands that if any such sweeping move were to be made now, it should be in pursuit to this bill, after detailed hearings. Opposition further contended that all the evidence on the Mobile plant indicated it would require 18 months to construct, and would be of no help in the current situation. On the other hand, if going private fertilizer concerns could get machinery and other priority help, now lacking, they could meet requirements with their own expanded production.

Private fertilizer manufacturers have the capacity to produce 400,000 tons of triple superphosphate, given materials and equipment, it was contended.

It is claimed by opponents of the Mobile project that TVA fertilizer, shipped in demonstration programs, was pushed by county agents using the argument that farmers were getting allotments and other benefits, and by inference, might lose them if they insisted on using commercial products. This charge is not documented. However, some members of Congress claim to have seen bags of TVA fertilizer left to rot on the ground, after farmers obtained it.

While evidence given Congress earlier indicated that most, if not all, of the production from the Mobile plant would be channeled to the Midwest, members in several states where private companies have recently bought or leased surplus Government facilities, are suspicious that more general competition with private manufacture would result.

A private chemical company has bought a former Government anhydrous ammonia plant in Kansas, and is now manufacturing fertilizer. It is further reported that as soon as additional phosphate rock can be obtained, with expansion of present mining facilities, this plant is going to manufacture heavy phosphate-base products.

In Louisiana, within recent weeks, a private chemical manufacturer is understood to have bought a Government plant at Sterlington, for fertilizer manufacture, while later still, the Government's huge installations at Lake Charles have become surplus, and on July 9, a bid was accepted by a Government agency for lease of a large chemical plant in this group, for private manufacture of fertilizer.

The Mobile plant is said to contemplate manufacture of 50,000 to 75,000 tons of concentrated phosphate fertilizer per year. However, opponents charge that it is entering a field already thoroughly developed, which consequently does not require any new pilot plant operations by the Government, and which would therefore, have no purpose except to compete with private manufacturers.

The prospect now is that any further move in this direction will involve active consideration of H. R. 2922, the Fertilizer Policy bill, and then after exhaustive hearings. It is evident that no such hearings can be held in the near future.

Meanwhile, re-activation of 15 U. S. ordnance plants to produce nitrogen fertilizer as a means of bolstering present stocks available for use in occupied foreign areas, has been criticized by Maurice H. Lockwood, president of the National Fertilizer Association, as failing to help the domestic situation. Besides the announced purpose, to help supply overseas needs, Mr. Lockwood expressed some uneasiness at the report plan of the Government to "borrow" supplies from commercial producers as well.

Minimum Wage Bill Seen Delayed

ALTHOUGH H. R. 4130 (the Norton bill) was scheduled to be reported out after July 18, this bill, establishing higher minimum wages for all labor covered by the Fair Labor Standards Act, is reliably considered to be pigeon-holed for the remainder of this Congress.

Chemical Shortages Force Continued Controls

THE CIVILIAN PRODUCTION Administration is prepared to continue the conservation and channeling controls now governing such materials as tin, antimony, and scarce chemicals, it is stated. The agency already is prepared to act in the case of any exceptionally urgent requirements for other scarce materials, "to the extent that this is necessary," it is added by a spokesman.

Reconversion Director John R. Steelman, in decrying premature easing of Washington controls, said in his recent report to the White House on this subject, that both natural and synthetic rubber continue in short supply, as well as many chemicals.

Consumption for the first half of this year has been at a peak rate of about 1,000,000 tons annually, it is stated with

respect to rubber, with synthetic production and imports falling short of demand. However, Steelman said, rubber shortages have not handicapped reconversion so far, although it has been necessary to continue controls over natural rubber, and to institute inventory controls over most synthetic rubber.

Shortages of other materials now interfering with reconversion are listed as tin, antimony, zinc, some forms and shapes of aluminum, cane alcohol, hide glue stock, potash, ethyl fluid, lead chemicals, various plastics and synthetic resins.

Under a new four-power agreement including the United States, Britain, France and the Netherlands, in addition to raising the price of natural rubber to 23½ cents for the last half of this year, international allocation of natural rubber is continued to the year-end. It is understood this country will apply for shipments totaling 140,000 long tons from British, French and Netherlands sources during this period, but purchases from Malaya may be made by this country, in any manner desired.

C. P. A. orders remaining in effect on July 1 included Cane Alcohol (L-353); Lead Chemicals (L-354); Ethyl Fluid (L-355); Molasses (M-54); Cinchona Bark and Cinchona Alkaloids (M-131); Chemicals and Allied Products (M-300); and Schedules 118, Penicillin; 119, Streptomycin; 120, Potash; Tapioca Flour (M-333); Hide Glue Stock (M-390); also L 103, Glass Containers and Closures; Distilled Spirits, Beverages, Wines, Protective Coatings; Uranium (M285).

Production scheduling under M-293 applies on scheduled products and in the Rubber Division, R-1, on Synthetic Rubber, Balata, etc. Imports of strategic materials remain covered by M-63, and M-21 on Iron and Steel production.

Third quarter pig tin quotas increased 10 percent over second quarter figures, and controls are now in effect for the first time on secondary tin, to provide for equitable distribution of all tin-containing metals.

Taxation Changes Mooted

THE PROTRACTED OPA battle caused many to overlook the plans for later in the session, and for the new Congress to meet after the first of the year, assuming its complexion remains substantially unchanged.

There is the threat by Administration forces to ask for an upward revision of taxes as an anti-inflation measure. By implication this would mean individual taxes, but there is a strong opinion this could not be accomplished without accompanying changes in corporation taxes. Industry men are known to be watching this possibility.

Currently, Congressional sentiment is for the opposite. Unless economic pressure later in the summer forces the issue, the move will be for lower taxes in all brackets, when it comes.

Large DDT Requirements Forecast

U. S. PUBLIC HEALTH Service officials estimate their requirements of DDT this year at approximately 1,000,000 pounds, it has been reported, in connection with acquisition by this service of more than 300,000 pounds of powdered and 52,000 gallons of liquid DDT from government surplus stocks. It was said that surplus sources offered the only promise of sufficient supplies for this agency. Other surplus stocks are being acquired, and will be used in this country for checking exotic disease plagues.

Fertilizer Control Bill Introduced

A BILL, S. 2373, has been introduced by Senator Guffey, Dem., Pa., by which virtually all fertilizer products manufactured in the United States would be subject to Federal inspection and labelling. The industry would actually be under close Government supervision at all stages.

However, after being referred to the Senate Agriculture Committee, the measure was sent to the Agriculture Department for analysis and report. The department had not reported, when this was written, and by the time such report is received, it is expected that it will be too late to schedule hearings before possibly late in the fall.

The bill, while introduced by Senator Guffey, also has the interest of Senators Downey, Calif., Kilgore, W. Va., Tunnell, Delaware, and Pepper, Florida, all Democrats, and all partisans of this type of legislation.

The same crowded legislative situation at the end of summer spelled delays for the anti-pollution bill, and others that started out as rather strong contenders. They still have much support, and can be expected to show up again, when Congress gets the election off its mind.

Coconut Oil Tax Further Suspended

THE PHILIPPINE TRADE Act approved in April provides for further suspense of the additional tax of 2 cents per pound on the first domestic processing of coconut oil or related combinations, first suspended in September, 1942.

Under the Act, the President of the United States may find that adequate supplies of copra and coconut oil from the Philippines are unavailable for processing in the United States, and further suspend the tax. He took this action on June 28, and the Bureau of Internal Revenue has now ordered that the suspension already in effect, will be continued indefinitely.

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U.S.I. CHEMICAL NEWS

AUGUST ★ A Monthly Series for Chemists and Executives of the Solvents and Chemical Consuming Industries ★ 1946

New Concentrates Produce Superior Household Sprays

Potent New Chemical Augments Pyrethrins In D&O Pyrenones

New concentrates, which will permit the manufacture of highly effective, low-cost household sprays, have been announced by Dodge and Olcott, Inc. Known as D&O Pyrenone Concentrates, they are carefully-proportioned combinations of pyrethrins with a new D&O-developed chemical, piperonyl butoxide (D&O No. 333). Liquid insecticides and aerosols made with this new compound are superior to straight pyrethrum insecticides in range of effectiveness, stability, and residual killing power. They are completely free from toxicological hazards, irritation, odor, and other undesirable characteristics.

Only one of these compounds — Pyrenone No. 20 *New* — is ready for use at the present time. It is considered to be the ideal formulation for the manufacture of liquid general-purpose household insecticides. Other Pyrenones will be announced within the next few months. Adequate amounts of these compounds for experimentation and testing are now available. Full-scale commercial deliveries will begin in the late fall, and ample supplies will be ready in time for the 1947 season.

New Chemical

Piperonyl butoxide (D&O No. 333), the new chemical developed by Dodge and Olcott, Inc. to augment straight pyrethrins, is a close relative of the already well-known piperonyl cyclohexenone (D&O 312). Piperonyl cyclohexenone has been, and is, giving extraordinary results in agricultural and certain other fields, and has been used very effectively in the formulation of household

(*Continued on next page*)

Urethan Holds Promise In Treatment of Leukemia

A definite palliative effect is noted in many cases of leukemia when urethan treatments are used, according to the findings of a group of British scientists. Up to the present, however, no cure has been discovered for this disease which is known as "cancer of the blood."

The British scientists state in a recent issue of a medical journal that in the most favorable cases treated with urethan, a fall in total white blood count to normal limits and a rise in hemoglobin were noted. They also claim to have observed enlarged lymph nodes and a reduction in the size of the spleen.

The results reported are similar to those obtained from X-ray therapy which has been employed for some time to give temporary relief and to prolong life in the chronic forms of the disease. Prior to the use of urethan, many drugs, including arsenic and benzene, were tried, but with little success.

U.S.I. Completes Plans for New Chemical Research Laboratory

Project At Stamford, Conn., Will Be Devoted To Research On Resins, Solvents, Organic Chemicals, And Manufacturing Methods

With the completion of plans for a new chemical research laboratory, another project in U.S.I.'s postwar program of expansion is now under way. A site for the building, which will house more than 200 skilled investigators, has been selected at Stamford, Conn. About half of the total 100,000 square feet within the walls of the new laboratory and auxiliary buildings will be devoted to U.S.I. projects; the other half will be used for research activities of Air Reduction Company, Incorporated.

U.S.I. research conducted at this laboratory will be concerned with solvents, resins, organic chemicals, and engineering development. A pilot plant, suitable for carrying out fairly large scale experiments, will be available in order to obtain information for building commercial-size plants.

Complete Facilities

The laboratory will be equipped with the most modern research facilities. Some of these, such as the technical library, the patent files, the drafting room, the analytical laboratory, the machine shop, and the physics laboratory will be shared by the research staffs of U.S.I. and Air Reduction.

The laboratory buildings will be red brick structures of modified colonial design. The main building will be three-stories high, L-shaped, with a clock tower at the juncture of the two wings. The separate laboratories of Air Reduction and U.S.I. will occupy the two larger wings, and a smaller wing will house equipment for pilot plant operations.

To Occupy 40 Acres

Title to 40 acres of land to accommodate the proposed laboratories and pilot plant has been acquired. The site of the new laboratory is in the western part of Stamford, and can be seen from the main line of the New York, New Haven & Hartford Railroad at a point about a mile south of the Stamford station. One corner of the 40-acre plot runs into the Township of Greenwich.

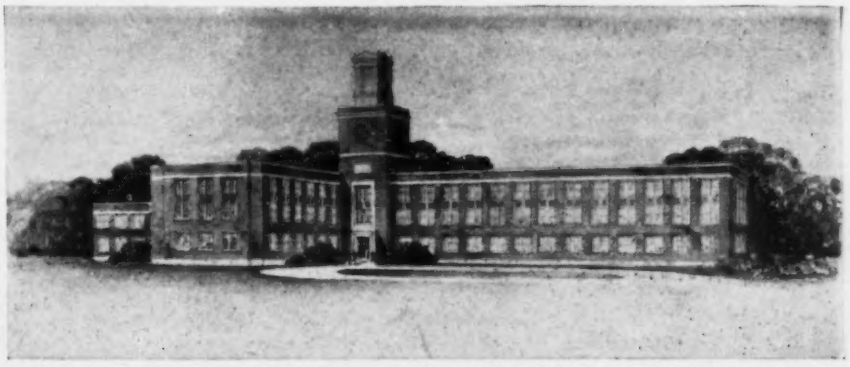
At present the chemical research laboratories of Air Reduction and U.S.I. are situated at 41 Magee Avenue, Stamford, where Air Reduction's liquefaction research laboratory and rare gases division are also located.

THE MONTH IN RUBBER

An antiseptic rubber, also claimed to be insecticidal, is invented . . . A new anti-aging substance for rubber sole mixtures is announced . . . Testing procedures for evaluating natural and synthetic rubbers are catalogued . . . A new blowing agent for sponge rubber is developed . . . A material said to be similar to GR-S, and compatible with natural rubber and numerous other synthetic rubbers, goes into full-scale production . . . Rubber bones for dogs are now chocolate flavored . . . A new plasticizer and extender for latex is put on the market . . . Inner tubes made with GR-I (Butyl) rubber are stated to have superior resistance to tearing . . . A chlorinated synthetic rubber is made available . . . Graphs showing market prices of rubber products from 1910 to 1945 are published . . . A new wax emulsion for use on rubber products of any color is produced.

U.S.I. Announces New Natural Feed Ingredients

Supplementing its line of feed ingredients which include Special Liquid Curbay, Curbay B-G, and Vacatone, U.S.I. is now offering two natural riboflavin products obtained from vegetative fermentation operations. They are *U.S.I. Brand Riboflavin Mixture #1*, containing one gram of active riboflavin per ounce of material, and *U.S.I. Brand Riboflavin Concentrate #85*, consisting of 85 parts per hundred of active riboflavin along with a natural carrier and a new vitamin of the B-complex. Inquiries should be directed to U. S. Industrial Chemicals, Inc.



Artist's conception of the new chemical research laboratory at Stamford, Conn., scheduled for completion within a year.

AUGUST ★ **U.S.I. CHEMICAL NEWS** ★ 1946

Addition of Methionine Spurs Growth Of Rats on Protein-Deficient Diet

When added to a diet low in protein, methionine can significantly increase the growth-rate of rats, according to a paper presented recently before an American scientific society. The authors also claim that the addition of methionine aids the rats in resisting high concentrations of benzene in the atmosphere. Methionine, one of the ten essential amino acids, is now being synthesized by a U.S.I. process which cuts costs about 97 per cent.

Four groups of 6-9 male albino rats, weighing about 180 grams each, were fed a protein-deficient diet, consisting of 69 per cent sugar, 9 per cent casein, 15 per cent lard, 4 per cent salt mixture, and 3 per cent cellophane with 500 mg. of yeast and 2 drops of cod liver oil daily. The diet of two groups was supplemented with 0.8 per cent of methionine daily. One group on the basic diet and one on the supplemented diet were exposed to an atmosphere of 90 per cent benzene for 42 hours weekly.

Both the methionine groups gained significantly more weight than their corresponding basic groups. The methionine group which was exposed to benzene showed far less ill effects than the basic group.

New Concentrates

(*Continued from preceding page*)

insecticides. However, its newer relative, piperonyl butoxide, has unique advantages, particularly in oil base sprays and in aerosols, because of its greater effectiveness against common household insects and its complete solubility in the mediums used for dilution.

Piperonyl butoxide is a colorless, odorless liquid completely miscible with mineral oils and readily soluble up to any desirable proportions in Freon-12 and other gases used in aerosols. Pyrenone concentrates, therefore, require no secondary solvents or coupling agents, thus avoiding all the complications and the toxicological hazards which might occur from their use.

Piperonyl butoxide is an insecticide when used alone. It will kill many varieties of insects at reasonably low concentrations, but its action is slow. When it is combined with even minute proportions of pyrethrins, the speed of action is immensely increased, and the concentration required to produce effective results is greatly decreased.

Pyrenone No. 20 *New*

After a long series of tests utilizing various combinations of piperonyl butoxide and pyrethrum, Pyrenone No. 20 *New* was developed as an ideal concentrate for the manufacture of general-purpose household sprays of the oil types. It can be used at 1-to-19 dilution with any suitable base oil. The result will be a crystal-clear solution having the characteristic light golden yellow of pyrethrum sprays. Both the concentrate and the sprays made from it have only a faint natural pyrethrum odor, and whatever odor may derive from the base oil used as a diluent.

Pyrenone sprays made at the recommended 1-to-19 dilution without the addition of any other toxic ingredient will be found to have rapid and satisfactory knockdown when tested under the usual conditions. By Peet-Grady standards, a Pyrenone spray made at 1-to-19 dilution is far above the minimum for a Grade AA spray. Pyrenone sprays will be found to be satisfactorily effective against the customary range of household insects.

Pyrenone is a registered trade mark of Dodge and Olcott, Inc.

Easy Drum-Handling

This new all-metal drum support comes from its manufacturer packed in its own, individual carton ready for mounting. It is claimed to convert any metal drum into a dispenser in a few minutes.

TECHNICAL DEVELOPMENTS

Further information on these items may be obtained by writing to U.S.I.

To prevent leakage from broken acid bottles a new acid-resistant coating is announced which is said to provide a protective armor around the bottles, and to hold its shape even though the glass underneath is shattered. **(No. 093)**

USI

An automatic paint brush cleaner, described as a unit consisting of a patented device and a special liquid, is reported to do a rapid and complete job, even removing the paint in the heel of the brush. **(No. 094)**

USI

To put out solvent fires, as well as gas and oil fires, a mechanical foam has been developed, which is claimed to meet all the rigid conditions of the new joint Army-Navy specifications. **(No. 095)**

USI

A new rustproofer for steel is described as protecting metal during the manufacturing stages and permitting a tighter bond with paints. **(No. 096)**

USI

To withstand 1,000 degrees F., new glass-based coatings are announced which are alleged to be rustproof, solventproof, and abrasionproof, and to withstand a 200-hour salt-spray test. **(No. 097)**

USI

A new moisture tester makes 3 moisture determinations per minute on sheet material, such as paper, cardboard, and veneer, according to the manufacturer. **(No. 098)**

USI

To evaporate heat-sensitive solutions, or solutions which tend to decompose, discolor, or separate in crusts, is the purpose of a new "rapid current evaporator." The apparatus is readily adaptable to plant operating conditions, the makers state. **(No. 099)**

USI

To speed textile finishing, a new catalyst is announced which is described as odorless, and water soluble. It is claimed to accelerate the action of thermoplastic resins used in finishing textiles. **(No. 100)**

USI

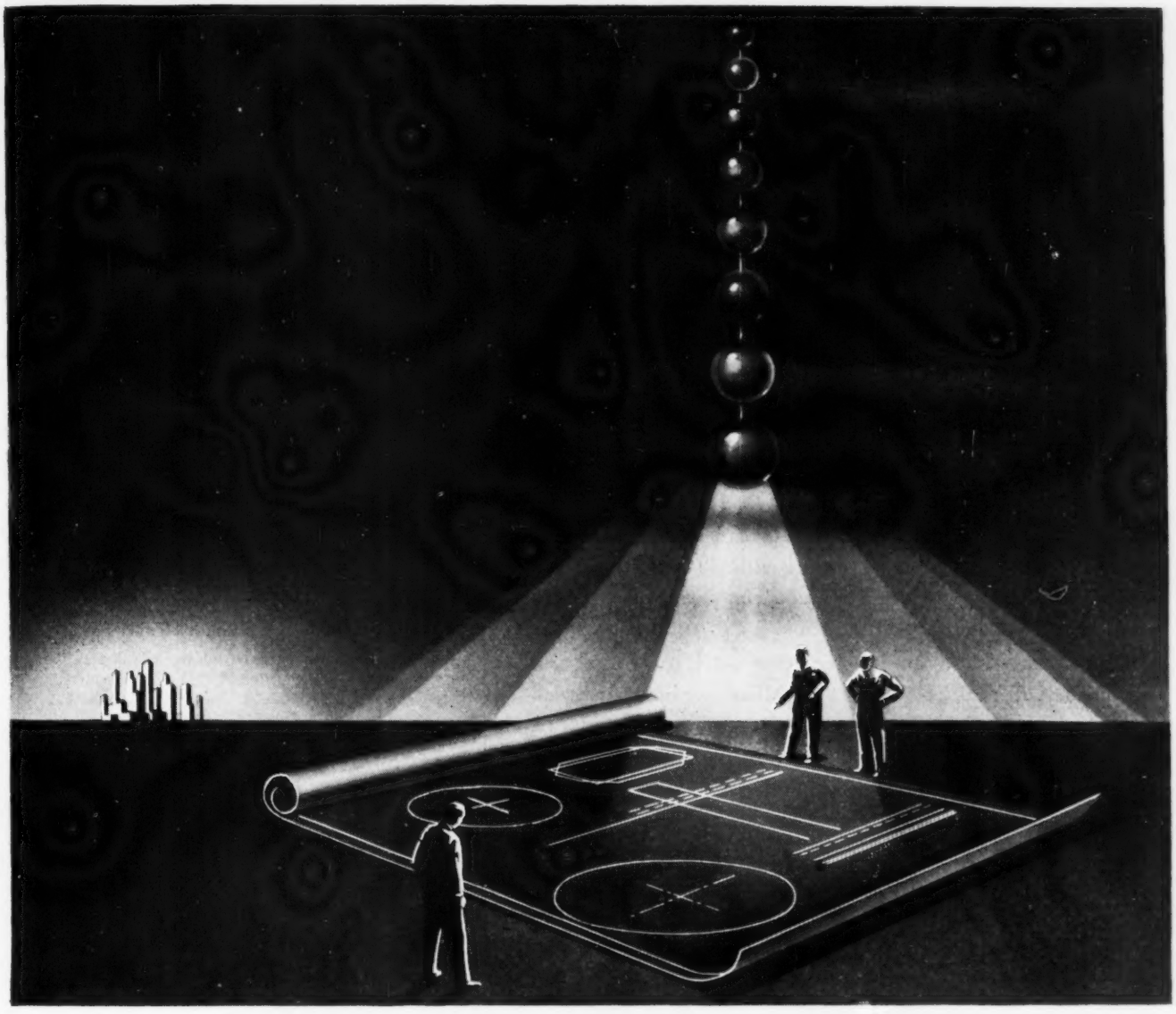
A new-type continuous viscosimeter is described as permitting instantaneous observation of viscosity values existing in a moving fluid stream under full-line pressure. **(No. 101)**

USI

A cold-setting padding glue, claimed to resist extremes of heat and cold, can be applied by hand brush or spray gun, according to the manufacturer. One gallon is reported to cover 200 square feet of padding area. **(No. 102)**

USI

To paint any automobile in one hour without the use of brushes or spray guns is the purpose of a new material which is reported to produce a factory-like job. The material is sold with a two-year guarantee. **(No. 103)**



NEW LIGHT FOR TOMORROW'S PLANS

Viewed in the light of these Armour organic chemicals (long carbon chain pure fatty acids and their derivatives) many blueprints of tomorrow's new products and processes stand out in sharp, clear lines. Your own research and application can begin by requesting samples and detailed information.

Neo-Fat Fatty Acids . . . Fractionally distilled pure fatty acids of 8 to 18 carbon atoms. Also special mixtures for specific uses.

Neo-Fat Synthetic Drying Oils . . . Fractionated fatty acids re-esterified to form uniform, fast-drying, quick-bodying oils.

Armeens (Aliphatic Amines) . . . cationic organic bases made from each of the Neo-Fat fatty acids.

Armacs (Amine Acetate Salts) . . . water-soluble amine acetates made from the Armeens by neutralizing with glacial acetic acid.

Armids (Aliphatic Amides) . . . high-melting organic nitrogen chemicals, derived from the full range of Neo-Fat fatty acids.

Arneels (Aliphatic Nitriles) . . . . organic cyanides from fats, including the 8 to 18 carbon atom chain lengths.

These versatile Armour chemicals are serving industry *today* in such diverse applications as protective coatings, rubber products, wax compounds, soaps, cosmetics, chemical intermediates, germicides, lubricants, flotation reagents, asphalt additives and plastics.

May we recommend the Neo-Fat or derivative best suited to your particular product or process —present or future?

ARMOUR *Chemical* **DIVISION**

ARMOUR AND COMPANY

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LIFE...ON THE

FILT-R-STIL* ION EXCHANGE DEMINERALIZING UNITS, NOW AVAILABLE, PROVIDE NEW, EASY LOW-COST WAY TO GET "CHEMICALLY PURE" WATER FOR DIVERSIFIED NEEDS

If water is one of your raw materials, you'll want to investigate Cyanamid's new FILT-R-STIL Units for delivering chemically pure water...water that is standardized and quality-controlled, like any other chemical...water that is really H_2O, C.P.! FILT-R-STIL Units contain IONAC* ion exchange resins, new synthetic chemicals that remove ionized solids without imparting color, odor or taste to the solution treated. The process involved is comparable to a simple, cold filtration.

Besides the Units shown here, other standard Units with capacities of 150, 300, 600 and 1200 gallons per hour are available. Special Units have been designed for applications requiring capacities in excess of 1,000,000 gallons per day.

Units shown and larger models are immediately available. Write us for complete data on FILT-R-STIL Demineralizing Units and IONAC ion exchange resins.

FILT-R-STIL Water Demineralizing Units produce:

- Water chemically equal to, or better than, distilled water . . . *and at lower cost.*
- Water of uniform quality . . . *even with a varying raw water supply.*
- Water stripped of its ionized solids content . . . *completely or partially—as specified.*

Here are some of the advantages inherent in the equipment itself:

- No heat, no cooling water, no periodic dismantling required . . . *and no scale formation.*
- Compact, self-contained, completely assembled . . . *require only connection to raw water source, drain, and electrical outlet.*
- Easy to install, maintain, and operate . . . *with long life, efficient service, and reliable results.*
- Automatic, precise, quality controls . . . *indicating the quality of the effluent (not volume treated or time consumed).*

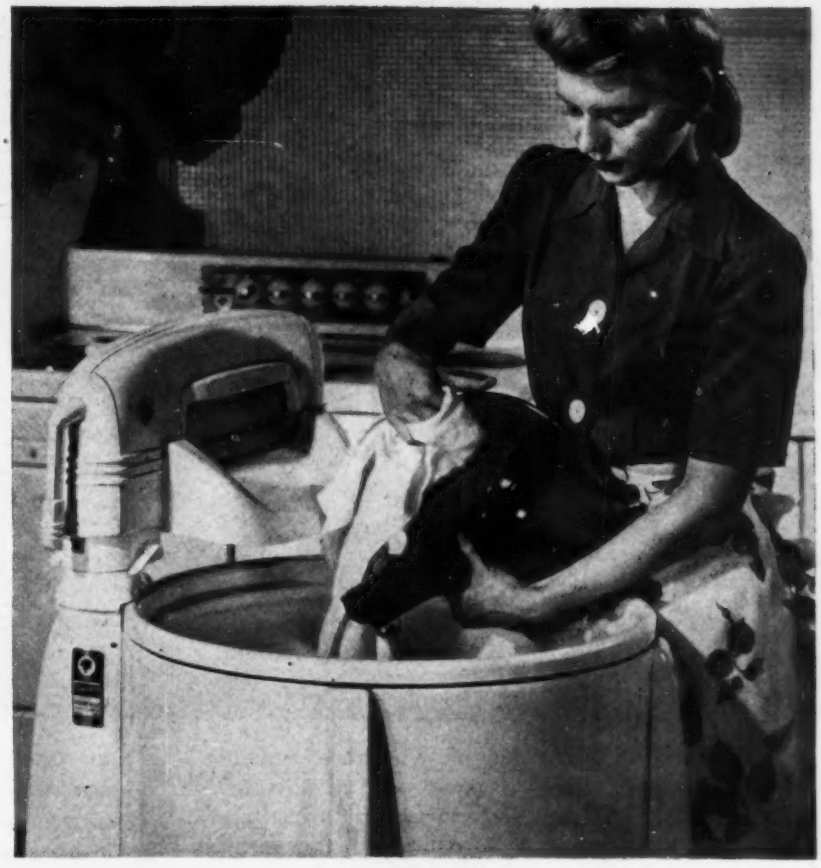
(*Left*) **FILT-R-STIL CARTRIDGE UNIT,** with a maximum flow rate of 10 gal. per hour, contains a disposable cartridge of IONAC resins. When the demineralizing capacity of the resins is exhausted, the cartridge may be discarded and a new one inserted. Overall dimensions: 8″ wide, 10″ deep, and 22″ high.

(*Left*) **FILT-R-STIL "LAB" UNIT,** with a maximum flow rate of 30 gal. per hour, utilizes four columns containing IONAC resins. The "Lab" Unit is the smallest of the regenerative-type Units. When the resins in the columns have reached their demineralizing capacity, they are easily regenerated with dilute acid and alkali solutions and ready for reuse. Cycles of use and regeneration can be repeated indefinitely.

CHEMICAL NEWSFRONT

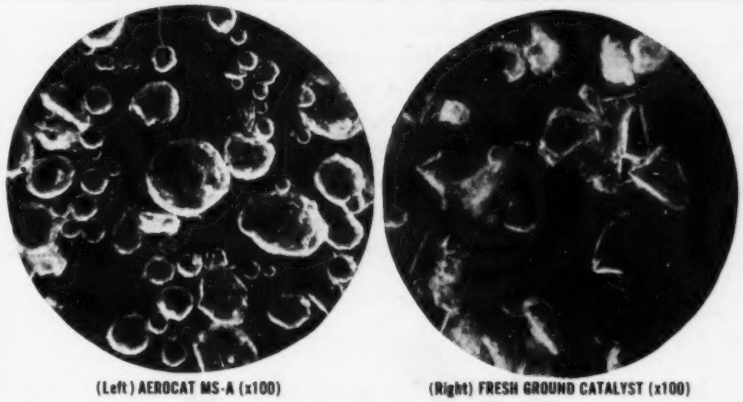
(*Right*) **HERE IS COLOR,** for the first time, in a shock-resistant, thermosetting plastic. This brilliant, permanent color is helping sell many household appliances because housewives like brighter, more cheerful-looking kitchens and laundries. During the war, Cyanamid's Plastics Division developed this special impact-resistant MELMAC* molding material in brown and black for hospital trays, food service, and various industrial uses. In addition to strength, it had the advantages of being lightweight, chemically inert, odorless, and tasteless. At the end of the war, Cyanamid added color for consumer appeal. Today many modern utilitarian products are being molded of this new MELMAC plastic.

It is available in red, blue, green, ivory, white, brown, and black, for such applications as this washing machine agitator molded by Eclipse Moulded Products Company for Speed Queen Washing Machine, tableware, food trays, vacuum cleaner housings, refrigerator and stove parts, syrup dispensers, germicide containers, bottle warmers, and many new products.



(*Below*) **LATEST ADVANCE** in synthetic fluid cracking catalysts for petroleum refining is Cyanamid's microspheroidal catalyst — AEROCAT**MS-A. Compare the spheroidal shape and controlled particle size distribution of AEROCAT MS-A (*left*) with the irregular sharp particles found in the ground catalyst (*right*). The following superior physical features of AEROCAT MS-A also result in operating and economic advantages:

Minimum Amount of Fines
Resistance to Attrition
Increased Catalytic Efficiency
Improved Flow Characteristics



(Left) AEROCAT MS-A (x100) (Right) FRESH GROUND CATALYST (x100)

An Invitation!

American Cyanamid will occupy Booth No. N49 at the National Chemical Exposition in the Chicago Coliseum, September 10th through September 14th. FILT-R-STIL *Demineralizing Units will be featured.* You are cordially invited to attend, and we hope visit with us. A request on your Company letterhead for an admission ticket to the Exposition will be promptly filled.

**Trade-mark of American Cyanamid & Chemical Corporation denoting cracking catalyst of its manufacture.

*Reg. U. S. Pat. Off.

American Cyanamid & Chemical Corporation

A Unit of American Cyanamid Company

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Nuchar

RESEARCH NEVER CEASES

It took over 25 years of pioneering development to make Nuchar what it is today—tops in activated carbons. Manufacturing research and industrial application have made it known all over the world for its exceptionally great porosity and the resultant extraordinary adsorptive properties.

But Nuchar research never stops. Nuchar chemists are always seeking to improve the product and Nuchar technicians are continously seeking better methods of application. They know that the answer to proper use of Nuchar in purification by adsorption process lies in inter-related research which is coordinated to give Nuchar users this vital information.

One thing sure, in transmitting this information, Nuchar engineers always recommend the most suitable quality of activated carbon for the use intended to insure maximum economy from this method of purification.

There's a Nuchar activated carbon for your purification process and a Nuchar technician ready to show you how to use it. Nuchar is made in a wide range of standard qualities to take care of a multitude of conditions. Special qualities are also available for specific uses. Get in touch with NUCHAR today for complete information and samples to take care of your purification problems.

Industrial Chemical Sales, Division West Virginia Pulp & Paper Company, 230 Park Avenue, New York 17, N. Y.

Please send me a copy of "Nuchar Active Carbon—purification by adsorption."

Name .....

Company .....

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Nuchar

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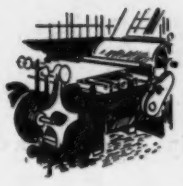
COMPOUNDS DO THESE JOBS WELL

Have you tried them in your processes?

1 rubber mold "release"

When dilute aqueous solutions of CARBOWAX compounds are used as mold lubricants, there is a minimum of carbon build-up. The cured articles are easily released from the mold.

2 textile lubricants



CARBOWAX compounds and their water solutions serve as lubricants for rayon and other textile fibres. One water rinse is sufficient to remove the size.

3 cosmetics

Cake make-up, shaving creams, hand lotions and hair preparations are among the many cosmetic formulations now made with CARBOWAX compounds. CARBOWAX compounds are water-soluble, and may be obtained in a wide range of viscosities permitting close control over the consistency of the finished product.

4 medicinal ointments

CARBOWAX compounds are water-soluble, inert, and will facilitate the action of the active ingredients. Their use in topical preparations has been sanctioned by the Food and Drug Administration.

5 adhesives

CARBOWAX compounds are used to stabilize the moisture content of adhesives. In envelope flap glues they keep the paper from curling.

CARBOWAX solid polyethylene glycols are available in five different molecular weights, ranging in appearance and consistency from a soft petrolatum-like solid to a hard wax. Further information on their properties and uses will be found in the new booklet "Carbowax Compounds and Polyethylene Glycols" (Form 4772). Send for your copy today.

SYNTHETIC ORGANIC CHEMICALS

CARBIDE AND CARBON CHEMICALS CORPORATION

Unit of Union Carbide and Carbon Corporation

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"Carbowax" is a registered trade-mark of Carbide and Carbon Chemicals Corporation.

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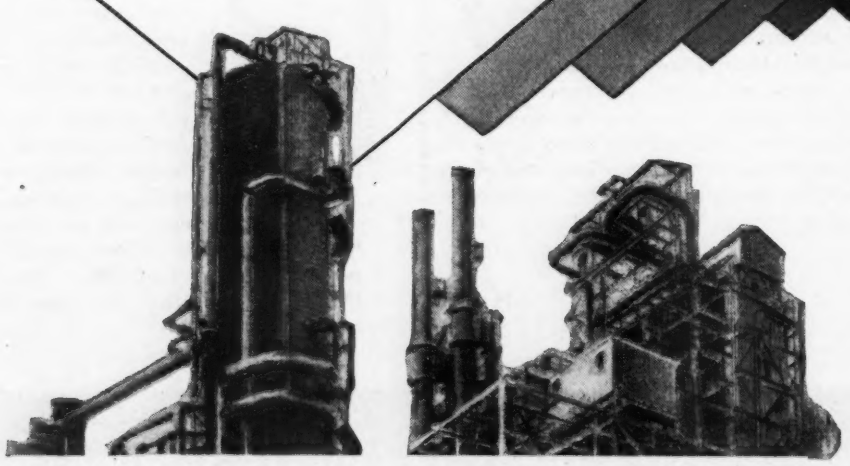
NAPHTHALENE

Separated and refined from coal-tar distillates.

Available in various forms ranging from brown lower melting to higher melting pure white crystalline types.

Used in preservation of hides, moth preventive, and in soil insecticides, as raw material for manufacture of organic chemicals and dyes, for alpha and beta naphthols and sulfonated derivatives. For chlorinated naphthalene, waxes, synthetic tanning agents, pharmaceuticals and plasticizers.

	Description and Applications
Crude	74°C minimum melting point. Shipped in tank cars.
	78°C minimum melting point. Shipped in light wood barrels and tank cars.
Refined	79.4°C minimum melting point. Shipped in bags, light wood barrels and tank cars.



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ALLIED CHEMICAL & DYE CORPORATION
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Barrett

FOR THE TEXTILE INDUSTRY

The textile industry, one of the biggest consumers of industrial chemicals, has learned to rely on Stauffer for dependable service. For Stauffer is geared to produce chemicals of the highest quality in large quantities. With more than a dozen plants located within convenient reach of every industrial center, Stauffer can deliver the goods . . . in quantity.

STAUFFER PRODUCTS

*Aluminum Sulphate	Chlorine	Silicon Tetrachloride	Sulphur Chloride
Borax	Citric Acid	Sodium Hydrosulphide	*Superphosphate
Boric Acid	*Copperas	Stripper, Textile	Tartar Emetic
Carbon Bisulphide	Cream of Tartar	Sulphur	Tartaric Acid
Carbon Tetrachloride	Muriatic Acid	Sulphuric Acid	Titanium Tetrachloride
Caustic Soda	Nitric Acid		

(*Items marked with star are sold on West Coast only.)

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555 South Flower Street, Los Angeles 13, Cal.
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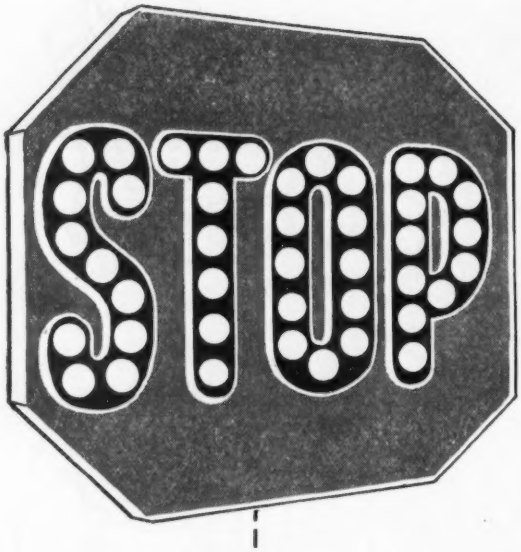
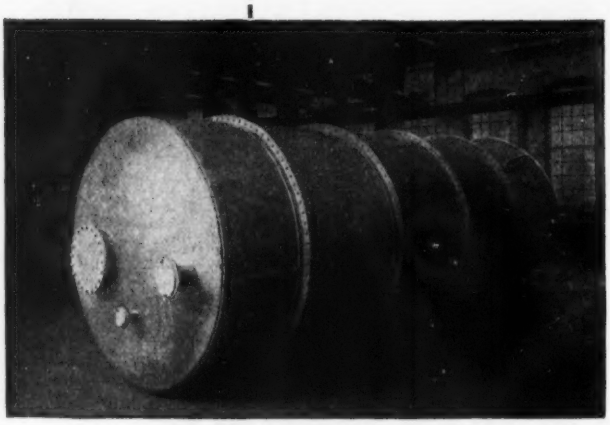
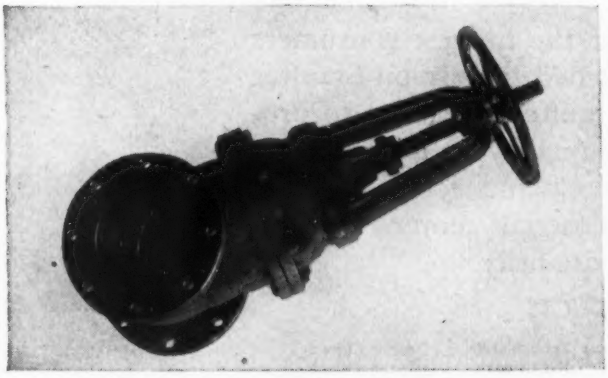


CORROSION

SET NEW PRODUCTION RECORDS WITH ACE RUBBER PROTECTION



Ace Rubber lined sectional tank for paper processing.



Gate, diaphragm and check valves with fully bonded Ace Hard Rubber linings over all inner surfaces.

Corrosion! It's there, whether you see it or not! It's a behind-the-scenes threat that makes equipment old before its time, impairs plant efficiency, often affects the very quality of your finished product.

You can put a stop to corrosion with Ace Hard Rubber. It guards your operations at such vital points as in the linings of tanks used for processing and storage—in pumps, pipe, fittings and valves for circulating active solutions—in a score of other important installations. Our research and engineering staffs will be glad to advise you on the applications of Ace Hard Rubber in your plant.

American Hard Rubber Company
General Sales Office: 11 Mercer St., New York 13, N. Y.
Branch Sales Offices:
111 W. Washington St., Chicago 2, Ill.
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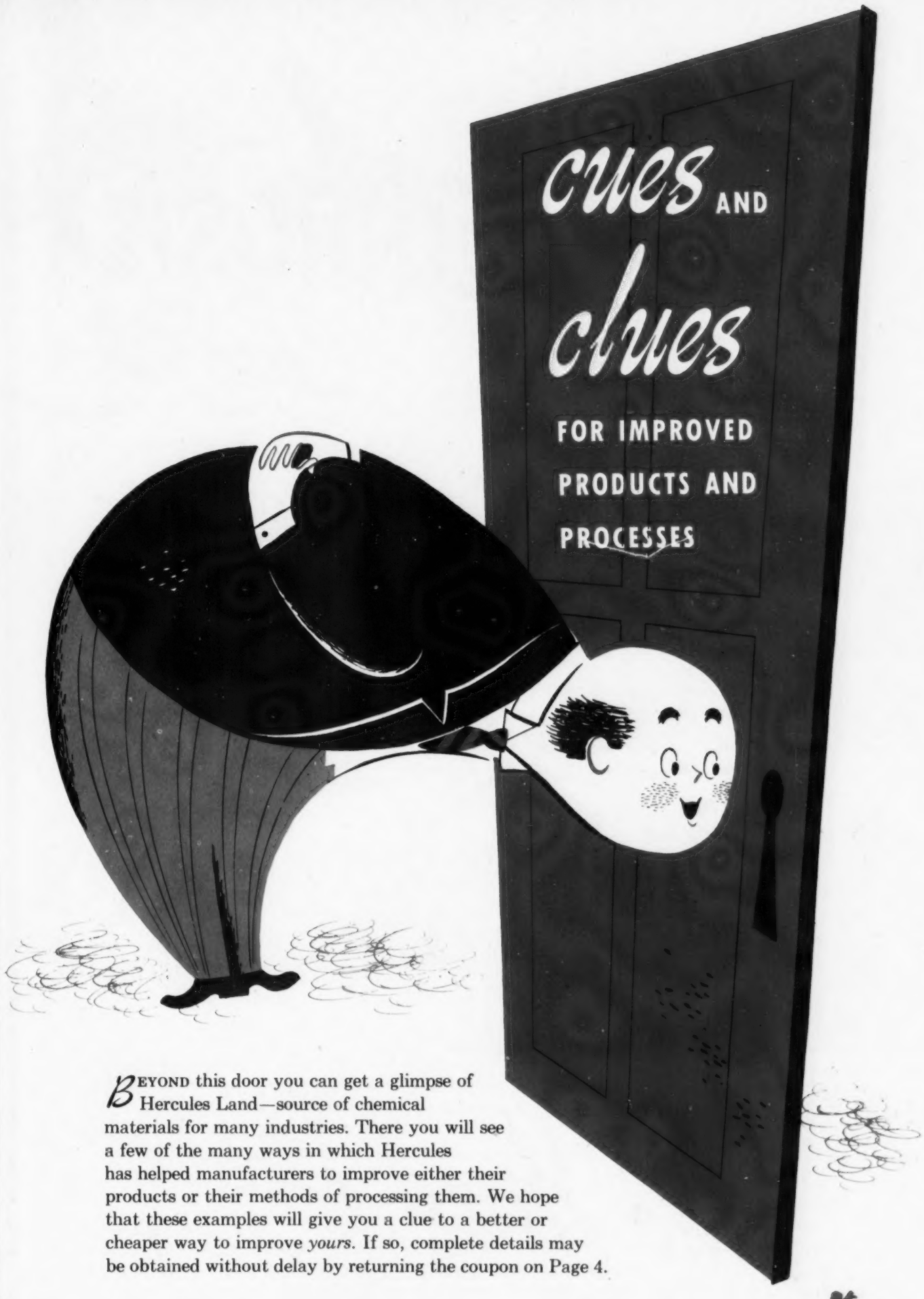
PLANT EXECUTIVES:

Write for free copy of 64 page handbook containing valuable information about anti-corrosion equipment.

VISIT OUR EXHIBIT, BOOTH NO. 6, NATIONAL CHEMICAL EXPOSITION, CHICAGO COLISEUM, SEPT. 10 - 14

Ace Hard Rubber

Ace-Saran Anti-Corrosion Equipment
Hard and Soft Rubber Lined Tanks, Pipe and Fittings
All-Hard Rubber Pipe, Fittings and Utensils
Hard Rubber Pumps in a Wide Range of Sizes and Capacities
Made-to-Specification Equipment—Hard Rubber and Hard Rubber Lined



BEYOND this door you can get a glimpse of Hercules Land—source of chemical materials for many industries. There you will see a few of the many ways in which Hercules has helped manufacturers to improve either their products or their methods of processing them. We hope that these examples will give you a clue to a better or cheaper way to improve *yours*. If so, complete details may be obtained without delay by returning the coupon on Page 4.

see next page

the right resins right now...

Remember Pentalyn* if you make varnishes! Remember Cellolyn if you make lacquers! Here are two Hercules groups of resins that are leaders in their respective fields. From the Pentalyns you can select a resin that is tailor-made to meet practically any varnish preparation and performance need. With Cellolyn 102 you get everything the scarce rosin-modified maleates contributed to lacquer *at lower cost*. Return coupon on Page 4 for details.

post-graduate in service...

This returned war veteran is one of the hundreds of men who have successfully completed their post-graduate training at Hercules' "Service Schools" He and the many other Hercules representatives now back from the armed forces, and from Hercules-operated ordnance plants, have been given a thorough refresher course in the post-war application of Hercules chemical materials in specific industries. If the developments outlined in these pages provide a clue to an improvement in your products or their processing, let us put you in touch with the Hercules representative nearest you.

pinch-hitter for plasticizers...

Here's a slugger to help you out in the plasticizer pinch! Hercolyn*, a high-boiling liquid resin—the hydrogenated methyl ester of pale wood rosin—is now available as an extender for castor oil (raw or blown), dibutyl phthalate, tricresyl phosphate, and other scarce plasticizers used in the manufacture of lacquers, chlorinated rubber finishes, and ethyl cellulose finishes. For lacquers or textile coatings it provides good "build" or body, high gloss, maximum alkali resistance, and excellent pigment dispersion. Hercolyn also finds use in ethyl cellulose plastics, pressure-sensitive adhesives, and in the transparentizing of paper. For details, return coupon on Page 4.

pumps with plus performance...

No hoofer would ever share his audience's applause with Hercules. Yet shoes of every type have become more serviceable . . . easier to make, too . . . through Hercules research. Modern shoe cements, for instance, owe their lasting adhesive power to Hercules Staybelite* Esters. Hercules Nitrocellulose and Hercules synthetic resins are the bases for finishes for leather and imitation leather. Hercules rosin and rosin derivatives even go into the making of shoe waxes and polishes. For further information, use coupon on next page.

thermoplastic shapes from sheets...

Now, with almost magical speed and ease, it has become commercially practical to produce large, three-dimensional plastic parts from flat sheets! Fabrics are the reinforcing materials for these sheets. Hercules Cellulose Acetate and Ethyl Cellulose are the thermoplastic binders that give them new durability and beauty, and permit intricate deep drawing without high temperatures and pressures or the need for costly steel dies. Remarkably light in weight, these new laminates have excellent impact strength, good electrical properties, and unlimited color range. Technical details may be obtained by returning coupon below.

the size you want when you want it...

Whether you buy papermaking size by the bag, drum, or tank car, Hercules has the type you want, *when you want it!* With Hercules' wide range of rosins, rosin derivatives, and wax and wax-resin emulsions, paper makers are assured of a never-failing source of sizing materials. This, plus Hercules trained technical representatives, offers the paper industry an outstanding service. If size or its application is important to you, return coupon below for complete details.

*REG. U. S. PAT. OFF. BY HERCULES POWDER COMPANY

HERCULES POWDER COMPANY
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PAPER MAKERS CHEMICALS — EXPLOSIVES
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WE USE HARSHAW CATALYTIC GRADE CHEMICALS

for alkylation • isomerization • polymerization

ALUMINUM CHLORIDE ANHYDROUS

ANTIMONY TRICHLORIDE ANHYDROUS

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BORON TRICHLORIDE

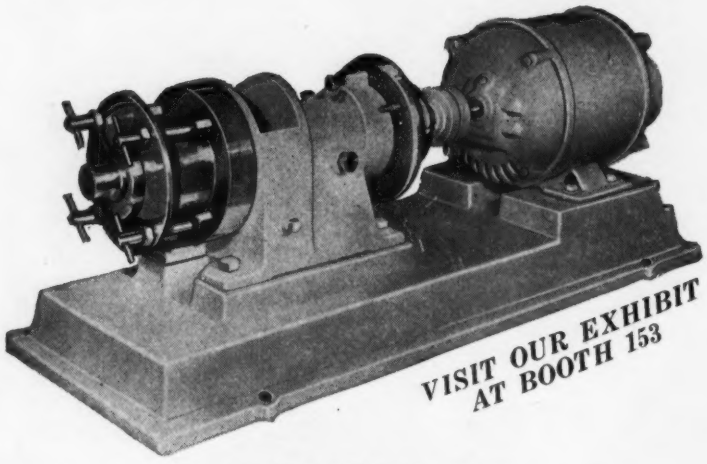
Refineries employing modern catalytic processes to produce today's improved motor fuels, require catalytic grade chemicals of high purity. Harshaw is supplying the petroleum industry with these catalytic grade chemicals, and they have earned a reputation for high purity. If you are using chemicals of this kind in your processing or if you are considering them for new applications, check with Harshaw—the benefit of more than forty years research and practical experience is available to you.

HARSHAW

THE HARSHAW CHEMICAL CO.
1945 East 97th Street, Cleveland 6, Ohio
BRANCHES IN PRINCIPAL CITIES

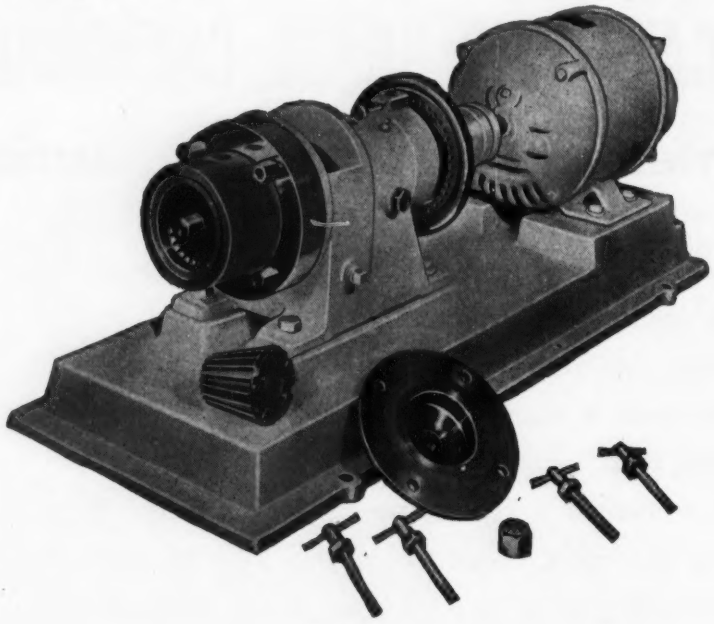
Chemicolloid Presents!

The New CHARLOTTE Laboratory Model W-10



NEW MODEL W-10

The NEW CHARLOTTE COLLOID MILL illustrated has been developed to fill a long felt need for a sturdy production machine with which to conduct laboratory tests of reliable character and also to make possible small scale production operations. It is of the same principle and rugged construction which characterize the larger models.



OPEN VIEW

Numerous Research and Plant Laboratories, as well as Educational Institutions, will find the new W-10 Model to be of great aid toward the solution of many difficult problems.

If interested in this newly developed stainless steel laboratory model, or larger sizes in this construction, please write for Catalogue, giving us as much information as available. This model is the best and most rugged machine we have developed since 1925. . . .

Furnished in Standard Current 220-440-550 Volt—60 cycle—2 or 3 phase.

Direct Current, single phase, or other currents at slightly additional prices.

CONSTRUCTION: Material chamber, inlet, outlet, and feed funnel, i.e., all parts coming in contact with material are of stainless steel. Also can be furnished in other metals.

CAPACITY: 1 to 50 gallons per hour.

For further information on this as well as other Charlotte Models write for Catalogue to

CHEMICOLLOID LABORATORIES, INC.

44 WHITEHALL STREET **NEW YORK 4, N. Y.**

Webster defines the keystone of an arch to be . . . "regarded as binding the whole together." That can equally be applied to KELCO ALGINS, keystones in many industrial applications.

KELCO ALGINS are equally efficient as STABILIZER, EMULSIFIER, BODYING or SUSPENDING AGENT, THICKENER and HYDROPHILIC COLLOID. They are ingredients in such widely-diversified products as paper sizing, textile printing pastes, cold water paints, tooth paste, industrial hand lotions, food and dairy products.

KELCO ALGINS are non-variable — readily adjust themselves to changing conditions of environment. They assure complete uniformity of formula. KELCO ALGINS are highly economical — and only a small quantity is needed to produce desired results.

KELCO ALGINS are products of Nature — free of impurities — processed under rigid specifications to produce consistent uniformity. If you have a stabilizing problem, won't you consult us — today? Our Technical Department is at your service — naturally, there is no cost nor obligation. Simply write us your intended application.

KELCO
REFINED ALGIN PRODUCTS

KELCO COMPANY

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Baker Carries Measured Purity into Organic Chemistry

The name Baker has been symbolic of measured chemical purity for nearly half a century. This rich heritage of chemical exactness and chemical control is now carried into another field—*organic chemicals.*

DDT

One of the first organic chemicals—purity by the ton—manufactured by Baker, was DDT (Dichloro-diphenyl-trichloroethane). Originally this chemical was made for the Government for war use. Today it is fighting disease on the home front, killing insects and agricultural pests, saving millions of dollars.

2, 4-D

Another organic chemical manufactured by Baker is 2,4-D (Dichlorophenoxyacetic) Acid, and the sodium salt of 2,4-D. Both are used in the formulation of weed killers. Both have their advantages, and Baker makes both.

CTAB

A more recent organic chemical made by Baker, is CTAB (Cetyl Trimethyl Ammonium Bromide). This quaternary ammonium salt will find a ready application as a bactericidal agent, and also as a special detergent.

Several more Baker organic chemicals are now in the pilot plant stage of development. These soon will be available on a commercial basis.

PURITY BY THE TON

This is not a mere Baker slogan. It is the result of Baker's "know how" in controlling chemical purity. This "know how" is also available to you now in organic chemistry.

If you have plans under way for manufacturing products involving the use of organic chemicals, your inquiries are invited. Address *Organic Chemical Division,* J. T. Baker Chemical Co., Phillipsburg, N. J.

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36. Methyl Iodide A.R.
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38. Potassium Iodate A.R.
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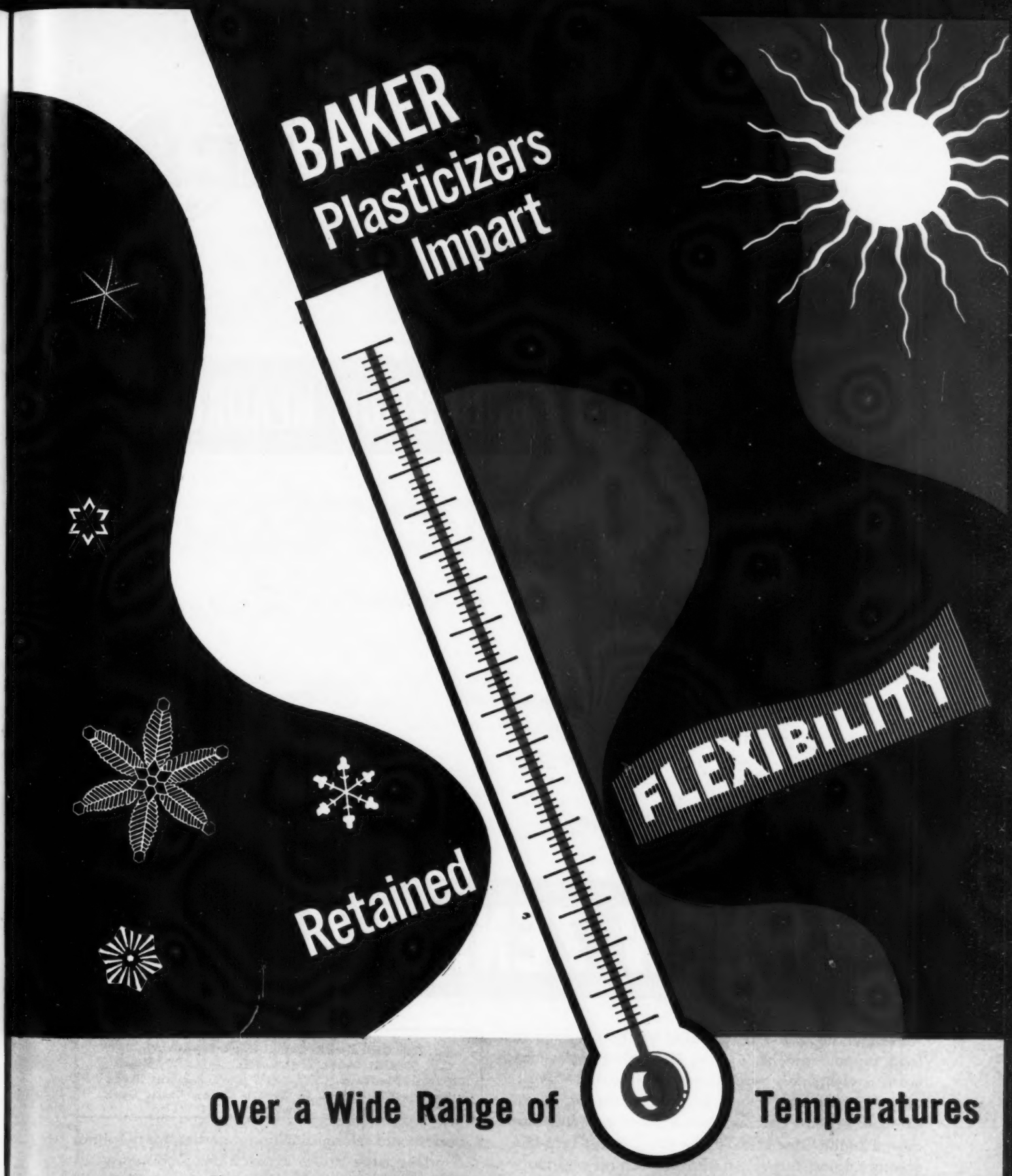

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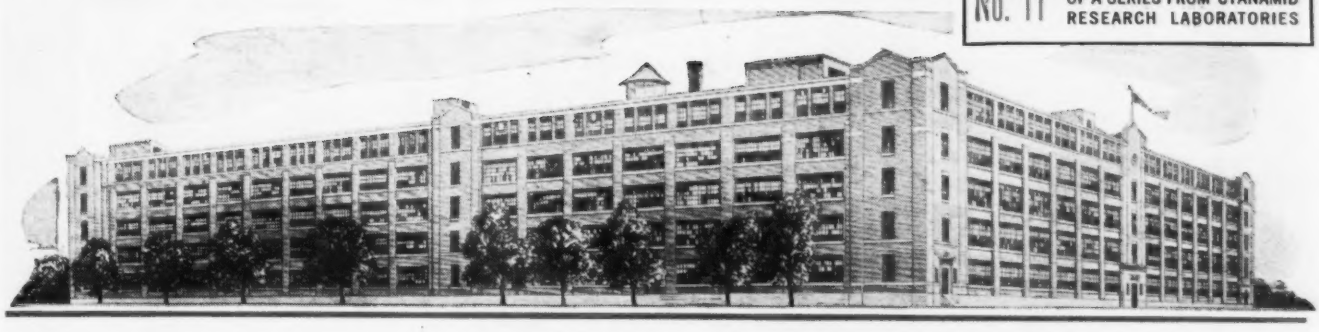

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Guanidine carbonate is an organic alkali having approximately the same strength as sodium carbonate. It is the starting point in the preparation of many other guanidine derivatives which find application as:

- Emulsifying agents
- Detergents
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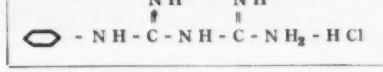
- Lubricant addition agents
- Antioxidants
- Root growth promoters
- Organic intermediates.

Physical properties of AERO Guanidine Carbonate

Form	White Powder
Purity	96 per cent
Molecular weight	180

Soluble in water and slightly soluble in alcohol and acetone.

Other Organic Nitrogen Chemicals

Acrylonitrile	$CH_2=CH-CN$
Guanidine compounds	$H_2N-C(=NH)-$
Guanylurea sulfate	$(H_2N-C(:NH)-NH-C(:O)-NH_2)_2H_2SO_4$
Glycolonitrile	$HO-CH_2-CN$
Lactonitrile	$CH_3-CHOH-CN$
Dicyanidiamide	$H_2N-C(:NH)NHCN$
Ethylene cyanohydrin	$HO-CH_2-CH_2-CN$
Phenyl biguanide hydrochloride	

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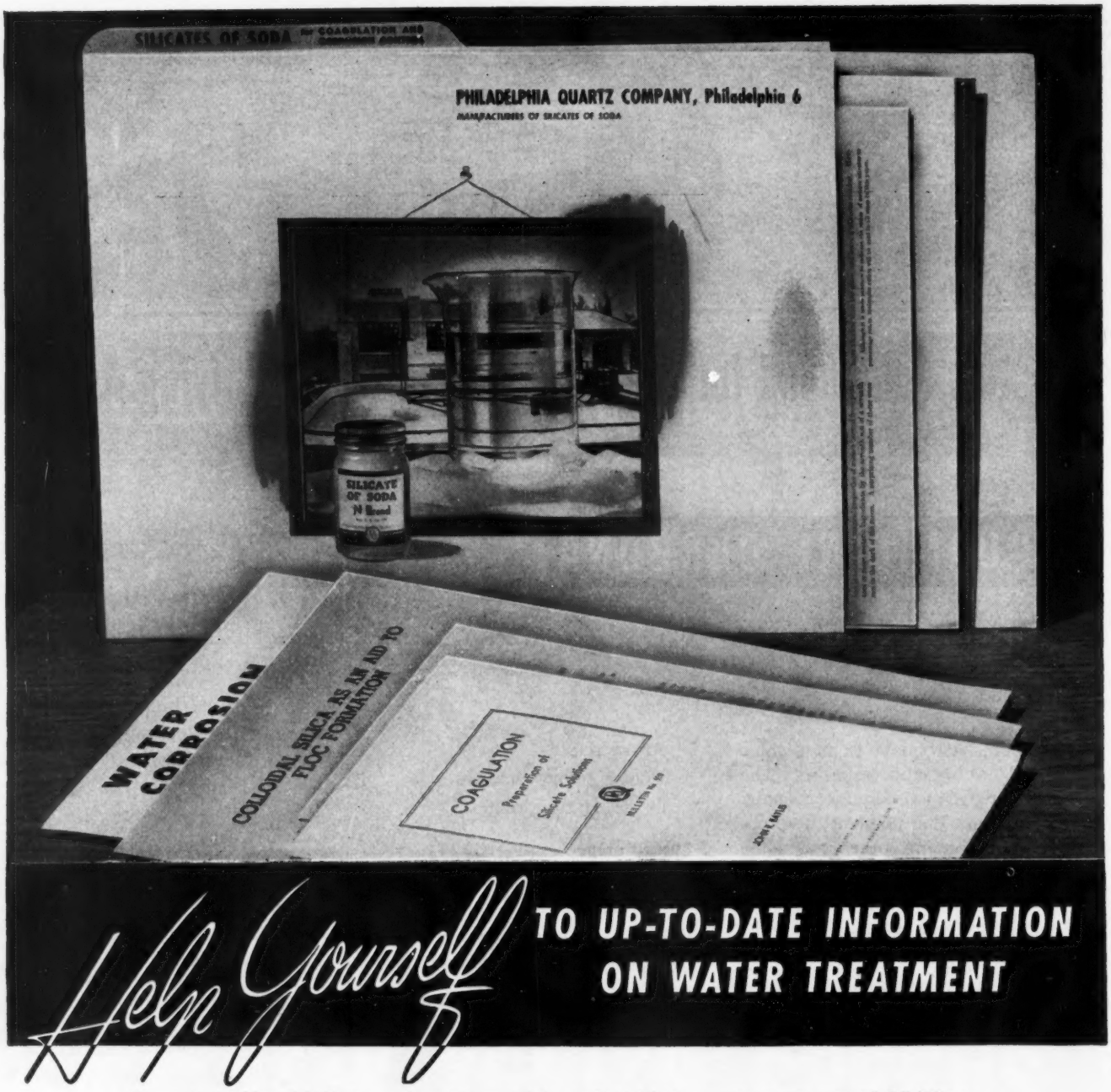

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SULFRAMIN DT and SULFRAMIN LW (Powder) Powerful synthetic detergents and foaming agents unsurpassed wherever hard water presents a problem. LW has a higher lauric content, and consequently is preferred when used in water colder than 50° C. Textile processors, manufacturers of dyeing assistants, tanning specialties, bath preparations and laundry detergents use either type, depending upon the temperature of the solution. LW is recommended for automotive cleansers since cold water is commonly used for car washing.

SULFRAMIN DH (Paste) A concentrated, slightly alkaline detergent offering great money value as an all around boil off compound. It is adaptable to the manufacture of various scouring, cleansing and dyeing assistants; and is usable under any water conditions.

SULFRAMIN DT (Paste) A strictly neutral, synthetic detergent, with good wetting qualities and high resistance to hard water. Manufacturers of dyeing assistants, and textile processors, use it principally in scouring and dyeing preparations compounded to function wherever alkaline solutions are to be avoided.

SULFRAMIN DR A neutral compound of high wetting and scouring qualities, having the appearance of a clear, sulphonated oil. It is immediately soluble in hot or cold water, and is therefore an ideal dyeing assistant. It can be employed advantageously as a straight product or in conjunction with various sulphonated oils. It lends itself ideally to the compounding of shampoos, liquid soap, and liquid cleansers.

SULFRAMIN P A powerful built-up detergent which is invaluable in the preparation of household detergents and cleaners. It is particularly efficient in washing machines, packaged laundry detergents, and general cleaners.

SULFRAMIN DHL A clear, leveling agent having the appearance of a sulphonated oil; and suitable for solving your most vexing dyeing problems. It has powerful leveling and penetrating qualities, and assures complete satisfaction in the processing of rayon and acetate fabrics. DHL also lends itself ideally to compounding; and is used extensively in the tanning industries for wetting-back applications.

SULFRAMIN N This is a non-foaming wetting agent, having the appearance of a heavy paste. Although of radically different chemical structure, Sulframin N shares many of the advantages inherent in many of the other Sulframin products. Its strongest feature is its complete immunity to the effects of inorganic acids and alkalies. Consequently, it is preferred in the processing of wool, such as in carbonizing, in dyeing, etc. Not only is Sulframin N an outstanding leveling agent; it can also be safely employed with any amount of alkali.

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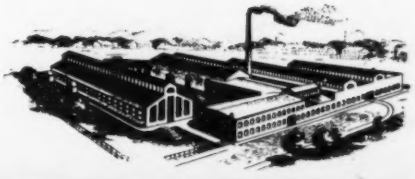

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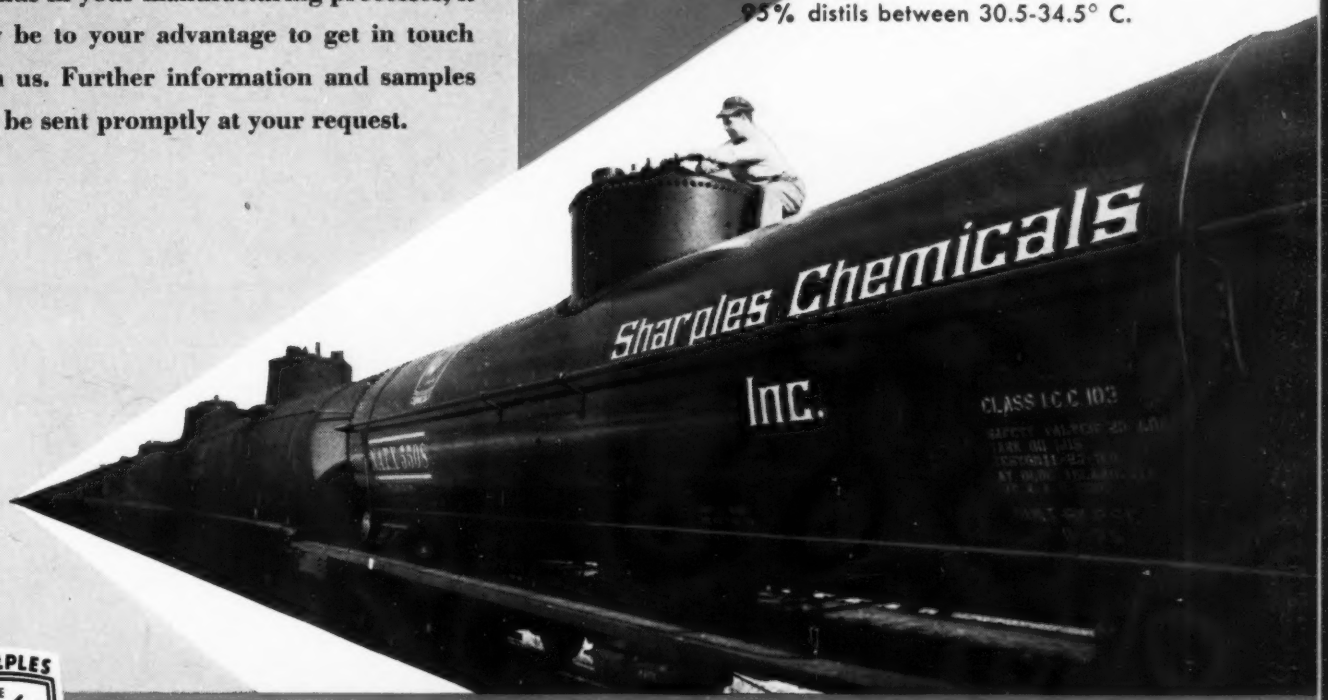
Color	Water White
Specific Gravity at 20°/20° C.	0.68-0.69
Amine Content (as isopropylamine)	98% (minimum)
Acid Insolubles	0.2% (maximum)
Distillation: 95% distils between	30.5-34.5° C.



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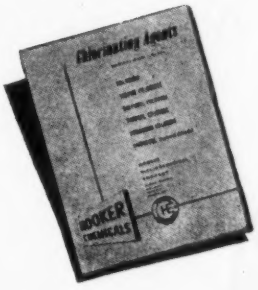

The Hooker Sulfur Chlorides, mono- and di-, provide convenient sources of chlorine in chemical processes where the use of elemental chlorine is not feasible. In these Hooker products you can always be sure of a carefully controlled chlorine content. The Monochloride contains a minimum of 50% chlorine, while the Dichloride has a minimum of 66% chlorine.

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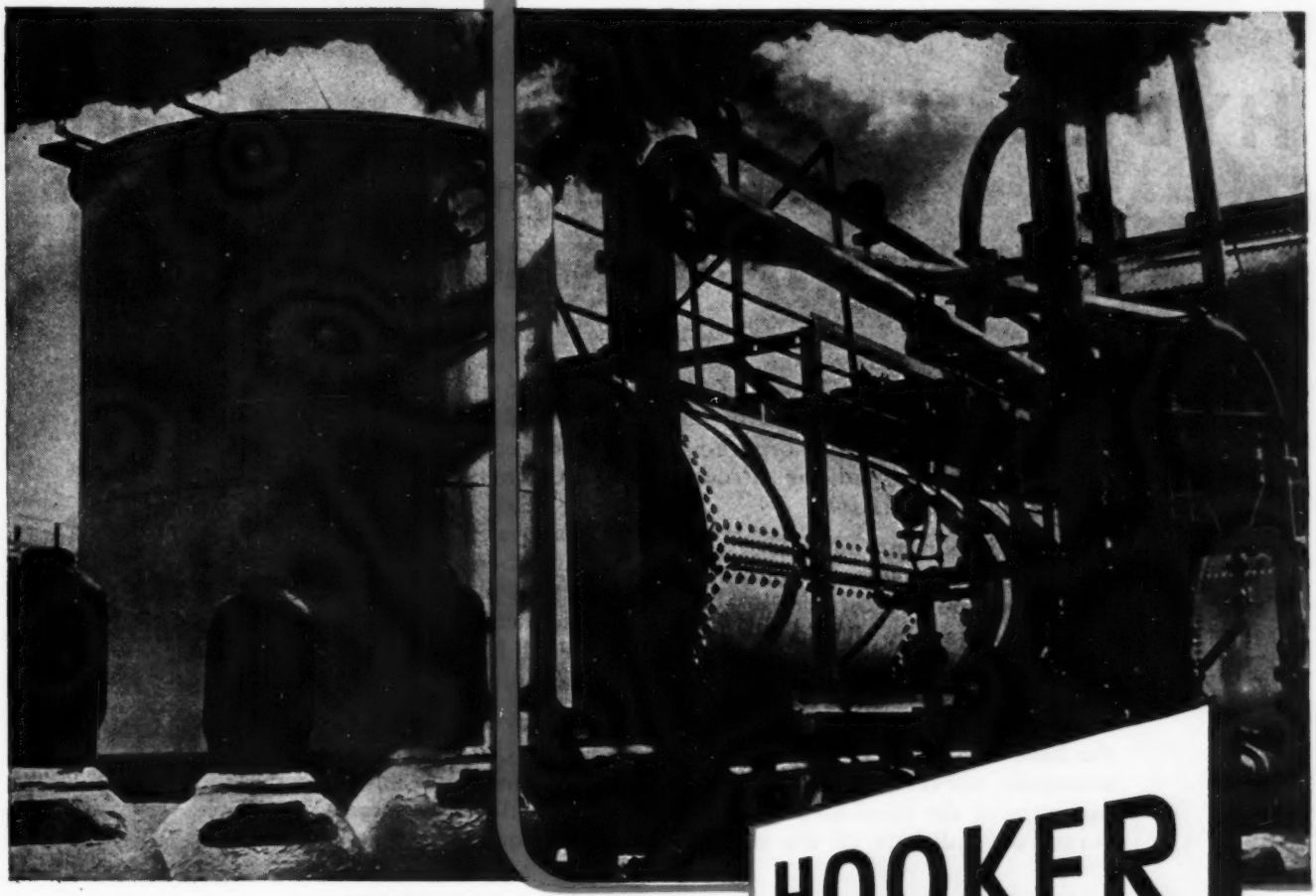
A part of the Hooker facilities for the production of chlorinated compounds.



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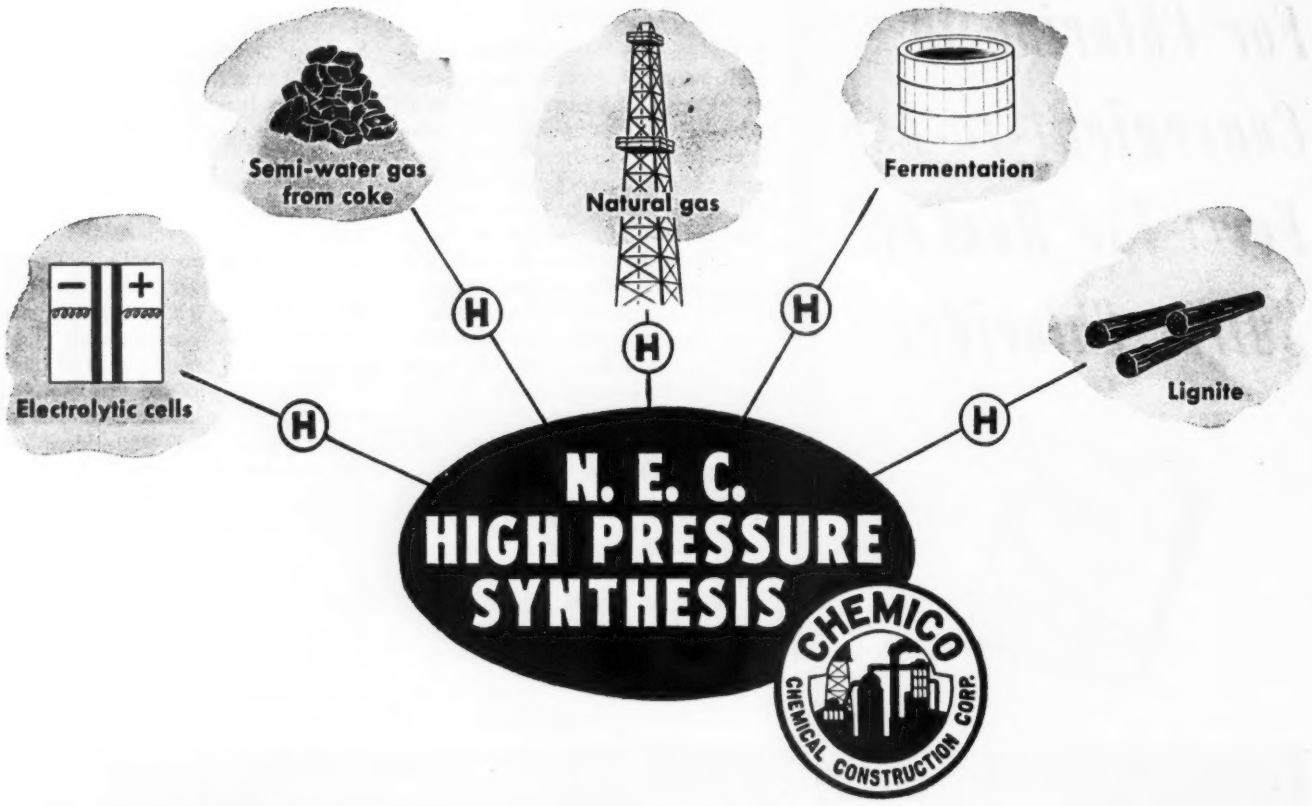

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Biotin

Merck & Co., Inc. now manufactures all the vitamins commercially available in pure form, with the exception of vitamins A and D.

Merck research has been directly responsible for many important contributions to the synthesis, development, and large-scale production of individual vitamin factors in pure form.

In a number of instances, the pure vitamins may be considered to be products of Merck research. Several were originally synthesized in The Merck Research Laboratories, and others have been synthesized by Merck chemists and collaborators in associated laboratories.

Because most of the known vitamins have now been made available in pure form, effective therapy of specific vitamin deficiencies can be conducted on a rational and controlled basis, under the direction of the physician.

MERCK VITAMINS

MERCK & CO., Inc. RAHWAY, NEW JERSEY

Manufacturing Chemists

MERCK MERCK

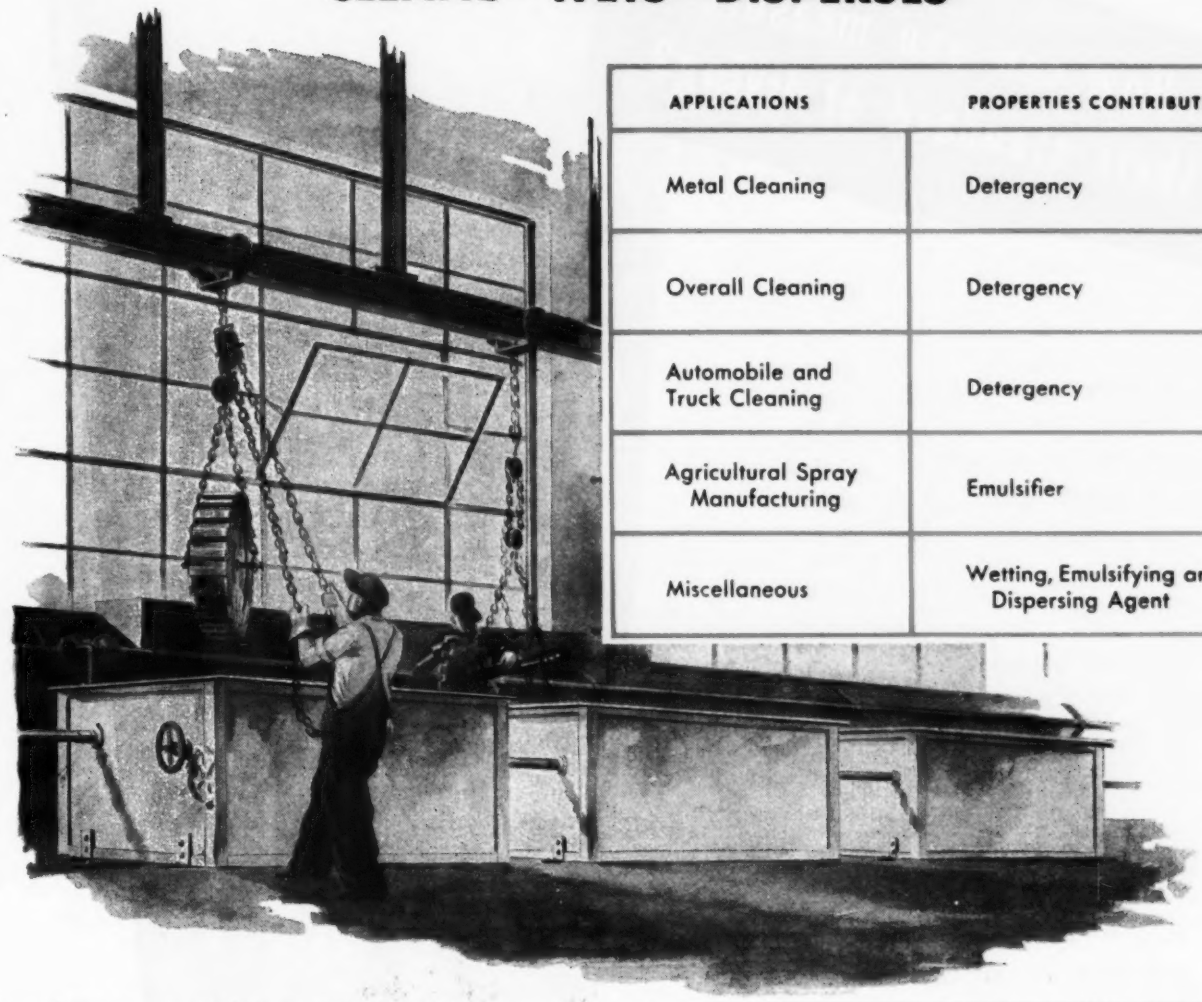
ORONITE CHEMICALS

Reg. U. S. Pat. Off.

THE NAME TO WATCH IN CHEMICALS

ORONITE SODIUM SULFONATE No. 4

CLEANS—WETS—DISPERSES



APPLICATIONS	PROPERTIES CONTRIBUTED
Metal Cleaning	Detergency
Overall Cleaning	Detergency
Automobile and Truck Cleaning	Detergency
Agricultural Spray Manufacturing	Emulsifier
Miscellaneous	Wetting, Emulsifying and Dispersing Agent

Complete water-solubility, slight solubility in mineral oil and compatibility in acid solutions recommend Oronite Sulfonate No. 4 especially for the industrial uses shown in the Applications table above. Sodium Sulfonate No. 4 is a dark brown liquid containing approximately 30% Sodium Sulfonate by weight.

Full information regarding this and other Oronite Sulfonates will be sent on request. Please write on your business letterhead, telling us your specific needs.

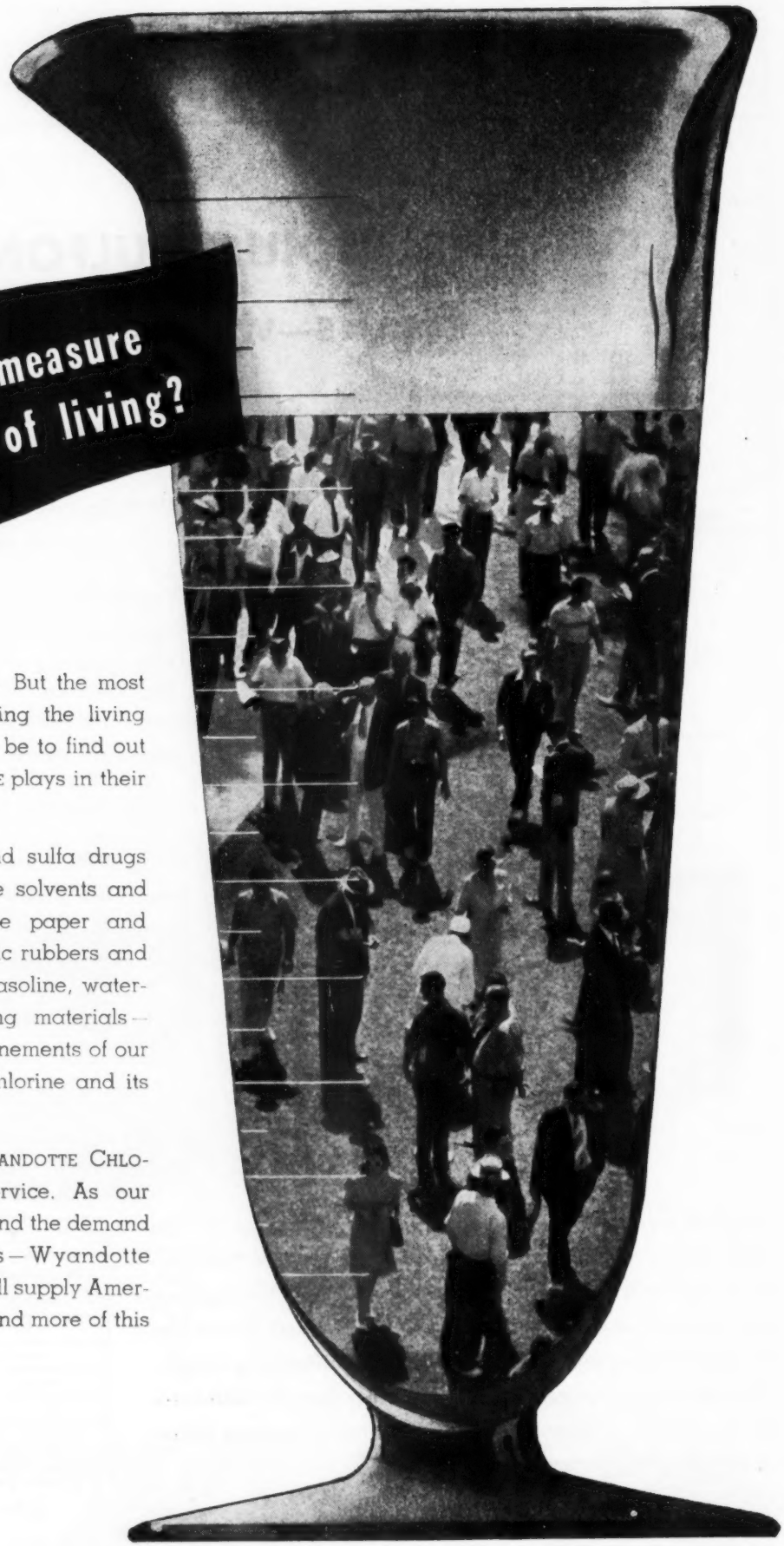
TYPICAL TESTS:	
Content by Weight:	
Sodium Sulfonate	30%
Sodium Sulfate	5
Polymerized Sulfonate	0.5
Water	64.5
Oil	Trace
Molecular Weight (Sodium Sulfonate)	380 (Approx.)
Weight, lbs. per gal.	9.4

1184

ORONITE CHEMICAL COMPANY

Russ Building, San Francisco 4, California
White-Henry-Stewart Bldg., Seattle 1, Wash.

30 Rockefeller Plaza, New York 20, N. Y.
Standard Oil Bldg., Los Angeles 15, Calif.



How can you measure their standard of living?

• There are lots of ways. But the most accurate means of gauging the living standard of people might be to find out how great a part CHLORINE plays in their daily lives.

• Medicines, vitamins and sulfa drugs . . . pure water, selective solvents and safe refrigerants . . . white paper and delicate dyes . . . synthetic rubbers and plastics . . . high-grade gasoline, water-proofing and fire-proofing materials—these and many other refinements of our civilization depend on Chlorine and its derivatives.

• Many users know WYANDOTTE CHLORINE and Wyandotte Service. As our standard of living rises—and the demand for Chlorine increases—Wyandotte Chemicals Corporation will supply American industry with more and more of this valuable chemical.

Wyandotte
REG. U. S. PAT. OFF.

Offices in Principal Cities

WYANDOTTE CHEMICALS CORPORATION • Michigan Alkali Division • Wyandotte, Mich.

Soda Ash • Caustic Soda • Bicarbonate of Soda • Calcium Carbonate • Calcium Chloride • Chlorine
Hydrogen • Sodium Zincates • Aromatic Intermediates • Dry Ice • Other Organic and Inorganic Chemicals

FEATURED CHEMICALS in the PFIZER FAMILY

- Acetyl Tributyl Citrate
- Acetyl Triethyl Citrate
- ✔ Ammonium Oxalate
- Ascorbic Acid
- Bi-Cap Flour Enrichment Mixtures
- Bismuth Preparations
- Calcium Gluconate
- Citric Acid
- Citrate Esters
- Cream Tartar
- Fumaric Acid
- Gluconic Acid
- Glucono Delta Lactone
- Iron and Ammonium Citrates
- ✔ Iron and Ammonium Oxalate
- Iron Gluconate
- ✔ Iron Oxalate
- Itaconic Acid
- Niacin
- Niacinamide
- ✔ Oxalates
- Penicillin
- Potassium Iodide
- ✔ Potassium Oxalate
- Riboflavin
- Rochelle Salt
- Sodium Citrate
- Sodium Gluconate
- Tartaric Acid
- Thiamine
- Triethyl Citrate

—and many other chemica's

no. 3 in a series:

The OXALATES

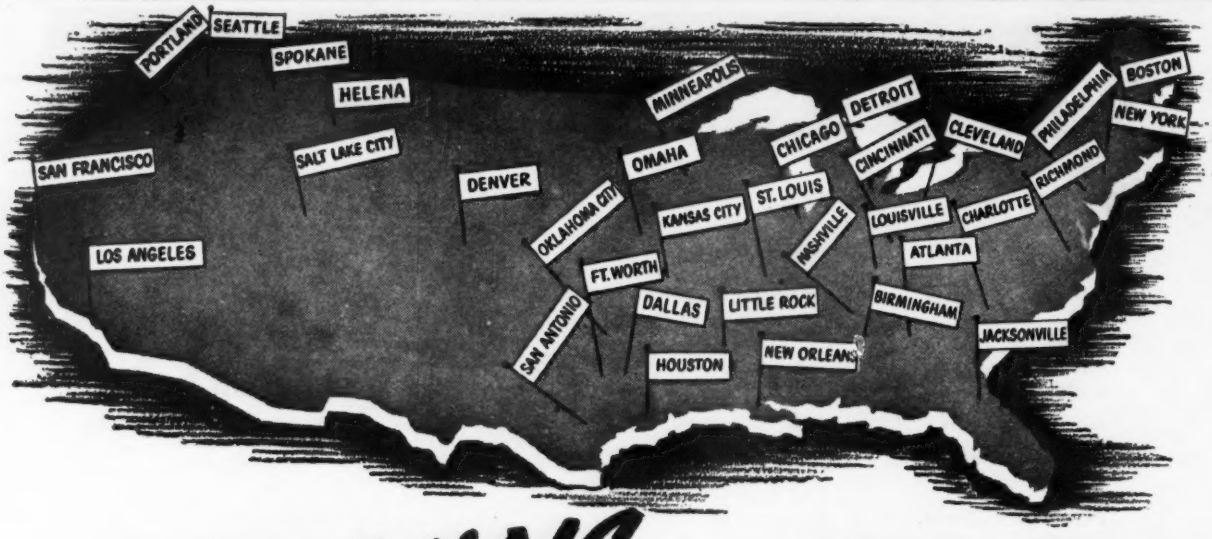
Here is a chemical "family within a family" — the Pfizer Oxalates. Among its members are Ammonium Oxalate, Potassium Oxalate, Iron Oxalate, Iron and Ammonium Oxalate and Iron and Sodium Oxalate.

In connection with each of these products, bear this in mind. Each is a worthy member of a larger family — one of more than a hundred Pfizer products. That means a near-century background that has always been a quality background . . . a high degree of physical uniformity and purity . . . the kind of reliability which can only be assured by such essentials as accurate control, modern equipment, ample capacity, technical skill and trained personnel throughout the organization. Chas. Pfizer & Co., Inc., 81 Maiden Lane, New York 7, N. Y., 444 West Grand Avenue, Chicago 10, Ill.; 605 Third Street, San Francisco 7, Cal.

PFIZER

Manufacturing Chemists Since 1849

GOVERNMENT-OWNED SURPLUS PROPERTY



33 BUYING SOURCES FOR INDUSTRIAL CHEMICALS

TYPICAL MONEY-SAVING BUYS

Acetone
Acids
Chlorinated Paraffine
(approx. 40% & 70%)
Gas cylinders (all types)
Hexachloroethane
Calcium carbide
Methyl bromide
Dyes
Plastic materials
Solvents
Sealing compounds
Petroleum catalysts
Activated charcoal
Silica gel
Calcium chloride
Strontium oxides
Dimethylaniline
Copper naphthenate
Synthetic & natural glues
Printing inks
(black & colors)
and most other chemicals

FROM acetone to xylol, the War Assets Administration is disposing of hundreds of surplus industrial chemicals at below market prices. To realize these savings for your business, write, wire or phone the nearest Regional Office, listed below, today. Items not available in your Region will be located for you through the special Inter-office Product Location service.

All items are being sold below current market price. Credit terms may be arranged. Make it *your* habit to check this source when your chemical stocks need replenishing.

All chemicals are subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the WAA certifying office serving your area and then to purchase the material offered herein.

EXPORTERS:

Most surplus property is available to the export market. Merchandise in short supply is withheld from export and if such items appear in this advertisement, they will be so identified by an asterisk.

FREE FACTS

War Assets Administration (address nearest Regional Office)

Please supply, without obligation, prices, available quantities and locations of items written in below:

....
....
....
.....

Name.....

Firm.....

Address.....

City.....Phone.....

155-3

WAR ASSETS ADMINISTRATION

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Fort Worth • Helena Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville • Minneapolis • Nashville • New Orleans • New York • Oklahoma City Omaha • Philadelphia • Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane

In the Treatment of
WATER-INSOLUBLE OILS WITH SOLUTIONS

Consider the Benefits of Adding
NACCONOL NRSF
The Stable Surface-Active Agent

Most Economical Wetting, Emulsifying, Foaming and Sterilizing Agent for Hot or Cold—Neutral, Acid or Alkaline Solutions

Listed are a few thought-stimulating indications of the value of NACCONOL NRSF in the chemical and allied industries.

All data developed to date shows that a low concentration of NACCONOL NRSF produces remarkable results whenever water-insoluble oils are being treated with water solutions.

Your inquiry will have prompt and completely confidential attention.

Consider NACCONOL NRSF in the treatment of any WATER INSOLUBLE OILS WITH WATER SOLUTIONS

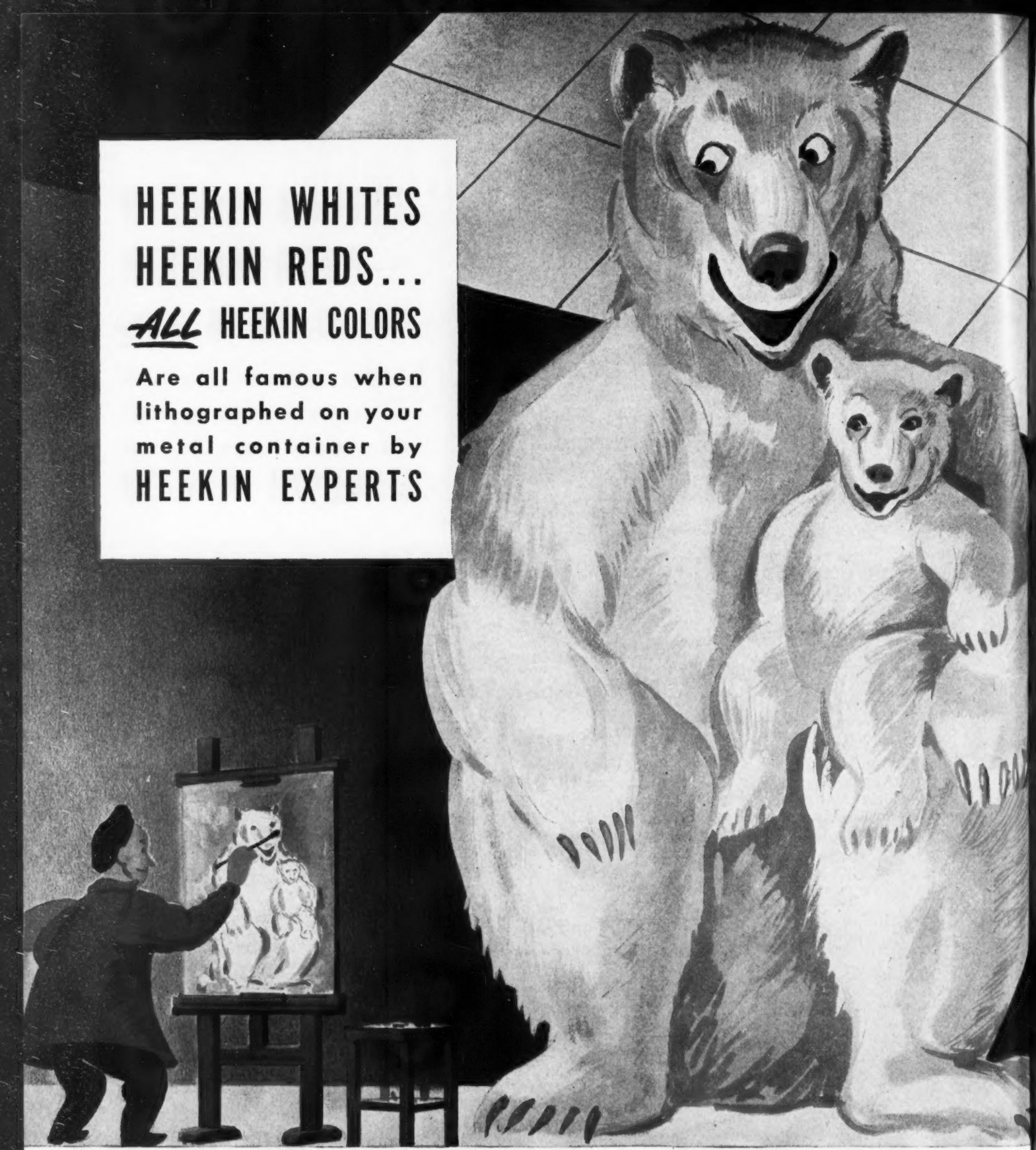
For instance:—

Oil Emulsions
Metal Cleaning
Synthetic Rubber
Oil Recovery
Insecticidal Emulsions
Acid Treatment of Oil Sands
Foundry Core Oils
Water Paints
Dry Cleaning

National Aniline developed America's first stable synthetic organic detergent and today is America's oldest and largest producer of the most widely-used synthetic-organic detergent, NACCONOL NRSF. Our unmatched technical experience in this field and unequalled production facilities are at your service.

National Aniline

DIVISION OF
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET NEW YORK 6, N. Y.



HEEKIN WHITES
HEEKIN REDS...
ALL HEEKIN COLORS

Are all famous when lithographed on your metal container by

HEEKIN EXPERTS

HEEKIN CANS

With Harmonized Colors

THE HEEKIN CAN CO. CINCINNATI 2, OHIO

FINER LITHOGRAPHERS OF METAL CANS SINCE 190

AGAIN

High Speed Delivery . . .

OF POPULAR U.S.I. PURE PHENOLIC RESINS

Now available for immediate shipment, Arofene 700 and Arofene 775 provide excellent durability and remarkable resistance to salt water, acids, strong alkali, and other corrosive substances. These pure phenolic resins, containing no rosin or rosin derivatives, are used principally in spar varnishes, chemical-resistant finishes, ethyl cellulose finishes, and in varnishes for fortifying alkyds. Products made with these resins exhibit good color, gloss, and drying properties. *Samples are available upon request.*

Arofene 700
Arofene 775

— For Durable, Chemical-Resistant Finishes

SPECIFICATIONS

AROFENE 700	
Acid Number:	70-85*
Melting Point (Mercury Method):	75-85°C.*
Color:	Paler than WW Rosin
Specific Gravity:	1.1
Solubility:	Complete in all hydrocarbons, usual varnish and lacquer solvents and varnish oils.

*Since this resin is heat reactive, these values are unimportant because in the cooking operation they change completely with the formation of a new chemical compound of which the oil is a part.

AROFENE 775	
Melting Point: (Mercury)	121-138°C.
Color of 50% solution of Acetone (GH 1933):	Less than 10
Specific Gravity at 25°C.:	1.05
Volatile (at 560°F. for 15 min.):	Less than 5%
Ash Content:	Less than 0.2%

U.S.I. INDUSTRIAL CHEMICALS INC.
60 East 42nd St., New York 17, N.Y.

More and more manufacturers are switching to HARDESTY fatty acids and their derivatives, following a trend that started when HARDESTY's first shipment was made. This trend was accentuated during the war when HARDESTY products provided many answers to the problems created by shortages of imported raw materials.

Even now, many manufacturers who followed the trend to HARDESTY products simply as a wartime expedient have decided—on the basis of superior performance for less cost—NEVER to go back to high priced imports.

The new trend to HARDESTY is a continuance of the recognition that HARDESTY is a dependable source of supply for stearic acid, red oil, glycerine, fatty acids and their derivatives. Manufacturers have learned to rely upon HARDESTY for quality in every product, uniformity in every shipment and service with every order.

HARDESTY has kept this trend going upward as a result of its never-ending research. Our laboratory technicians—with long experience in the chemistry of fatty acids—are constantly demonstrating to manufacturers how they can save money by first consulting HARDESTY on a new problem.

HARDESTY products are available in sufficient quantities to meet manufacturing schedules and priced to fit cost sheets. If you have a problem—old or new—our technical knowledge and experience are ready to go to work for you.

Get in touch with HARDESTY today outlining your particular problem. We'll show you with information and samples why it pays to KEEP IN TOUCH WITH HARDESTY.

W. C. HARDESTY COMPANY, 41 East 42nd Street, New York 17, N. Y. FACTORIES: Dover, Ohio; Los Angeles, Calif.; Toronto, Canda.
HARDESTY PRODUCTS: Stearic Acid • Red Oil • Glycerine • Stearine Pitch • White Oleine • Hydrogenated Fatty Acids • Animal and Vegetable Distilled Fatty Acids.

W·C·
HARDESTY
COMPANY

KOPPERS

Picolines

KOPPERS

Iso-quinoline

A KOPPERS PRODUCT

KOPPERS REFINED 3° MIXED PICOLINES
(BETA PICOLINE, GAMMA PICOLINE, and 2,6 LUTIDINE)

Koppers regularly produces appreciable quantities of these tar bases. Large production capacity enables us to supply them in volume. Write for our Base Data Sheet, giving properties and specifications.

Also available—

Denaturing Grade Pyridine
Refined 2,4 Lutidine
Refined Toluidines
High Boiling Tar Bases

Specifications

REFINED MIXED PICOLINES

Distillation Point	Max. 3°C., 2 to 97%, between 141 and 145°C.
Water Not More Than	0.3
Oil Not More Than	0.3
Color Not Darker Than	C-¼
Specific Gravity at 15.5°/15.5°C.	0.948-0.956

REFINED ISOQUINOLINE

Freezing Point	Min. 20°C.*
Water Not More Than	0.5

*Determined on a dried sample.

KOPPERS COMPANY, INC.
Tar & Chemical Division
Pittsburgh 19, Pa.

SPECIAL SALE OF SURPLUS

CHIP WRINGERS

The need for maximum conservation of metals, cutting oils and cutting tools led during the war to wide purchases of chip wringers, oil extractors and allied centrifugal equipment. Today hundreds of these machines are being turned back to private industry and can be applied immediately to the job of making *extra* profits for you. In every major metal working center they are available in standard sizes, makes and models at quick sale prices. Simply call your nearest W. A. A. office, below, or use the coupon.

SPECIAL NOTE TO MAKERS OF AND DEALERS IN CENTRIFUGAL EQUIPMENT

EXTRA PROFITS FOR YOU!

How big is your backlog? By reconditioning and refitting your own brand equipment you can make an *extra* profit now, build customer good will, and insure that equipment bearing your name keeps that name in good repute. Your customers need your product. By repurchasing and reconditioning your own equipment you can do them and yourself a favor. To negotiate repurchase, simply

CALL NEAREST W. A. A. OFFICE BELOW

VETERANS: Although this material has been previously offered to priority claimants, 10% of the merchandise has been reserved to fill any further needs of priority claimants, including Veterans of World War II, who are invited to contact the Regional Office serving their area with respect to this material.

MAIL TODAY!

To War Assets Administration: I am interested in Chip Oil Extractors of the following makes and size or model.

Make ..... Size or Model No. .....

....

I am also interested in information on the following:

• Separators • Centrifugal Filters • .....

• Oil Purifiers • ..... • .....

Name .....

Tel. No. .....

Firm .....

Address .....

City .....

State 468-2

WAR ASSETS ADMINISTRATION

Offices located at: Atlanta · Birmingham · Boston · Charlotte · Chicago · Cincinnati · Cleveland · Dallas · Denver Detroit · Fort Worth · Helena · Houston · Jacksonville · Kansas City, Mo. · Little Rock · Los Angeles · Louisville Minneapolis · Nashville · New Orleans · New York · Oklahoma City · Omaha · Philadelphia Portland, Ore. · Richmond · St. Louis · Salt Lake City · San Antonio · San Francisco · Seattle · Spokane

Chemicals

FOR THE PROCESS INDUSTRIES

THERE'S no substitute for the word experience. It's well to bear in mind that Turner has been supplying chemicals to the process industries for over 75 years. Call on us the next time you're in the market and you'll be quick to say that Turner is *"long on quality and strong on service."*

TURNER CHEMICALS

- Ammonium Sulphate (Refined)
- Ammonium Persulphate
- Borax
- Caustic Soda (Flake and Solid)
- Caustic Potash
- Sodium Chloride
- Carbonate of Potash
- Potassium Persulphate
- Copper Carbonate
- Bromides (Sodium — Potassium — Ammonium)
- Phosphorus Oxychloride
- Phosphorus Trichloride
- Stearates (Aluminum—Calcium —Zinc)

JOSEPH TURNER & CO

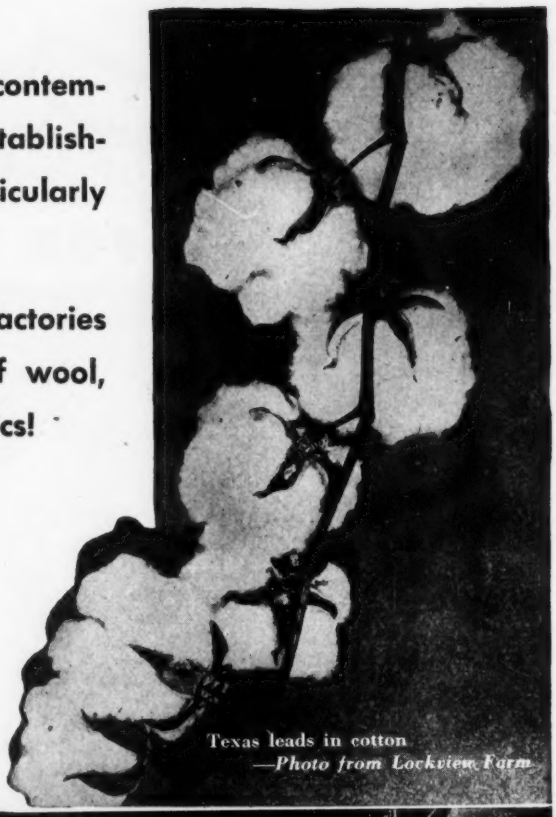
83 Exchange Place, Providence, R. I. **RIDGEFIELD, NEW JERSEY** 435 N. Michigan Ave., Chicago 11, Ill.

From Governor Roberts' Texas, 1881:

"Now . . . we can begin to contemplate the advantages of establishing factories in Texas, particularly for cotton spinning . . ."

. . . and, we add, also factories for the spinning of wool, mohair and synthetics!

Texas produces 23.7% of U. S. cotton
Texas produces 19.1% of U. S. wool
Texas produces 86.1% of U. S. mohair
Texas produces 22.4% of U. S. cotton linters



Texas leads in cotton
—Photo from Lockview Farm

. . . and before you know it, Texas will be producing a heavy percentage of those synthetics which can be made from the hydrocarbons of *natural gas*.

What more can a textile industry ask?

Markets? Texas itself, the middle west, the mountain states, both coasts.

Transportation? Trunk line railways, intercoastal and intracoastal shipping, water routes to world markets.

Fuel? *Natural gas*—abundant, economical, efficient.

Investigate the textile possibilities of the Texas Coast Country. Let us prepare a comprehensive textile survey for your company, or, better, come down and let us show you the Texas Coast Country's possibilities. There is, of course, neither cost nor obligation, and your inquiry will be kept in strict confidence. Address Research Department, Houston Pipe Line Company, Houston, Texas.

HOUSTON PIPE LINE CO.
Subsidiary of Houston Oil Company of Texas
GEO. A. HILL, JR. President
Wholesalers of Natural GAS

Texas offers opportunity for more of these
—Photo by Bob Bailey

Texas leads in wool
—Photo from Sheep and Goat Raiser

Texas offers opportunity for more of these
—Photo by Bob Bailey

. . . MADE RIGHT WHEN MADE WITH

PENN SALT

POTASSIUM CHLORATE

In products where quality is important, Penn Salt Potassium Chlorate finds wide acceptance. Every step in the production of Potassium Chlorate from raw material to the finished product is carefully inspected.

YOU GET POTASSIUM CHLORATE OF A UNIFORMLY HIGH QUALITY WHEN YOU BUY FROM PENN SALT!

Besides playing an important part in the manufacture of matches, explosives and pyrotechnics, Potassium Chlorate is essential in the making of paper, dyes and disinfectants. It is extremely active . . . reacts rapidly and completely with other ingredients to produce an excellent fusion.

Write us for further information about Penn Salt Potassium Chlorate

PENNSYLVANIA SALT
MANUFACTURING COMPANY
Chemicals

PHILADELPHIA 7, PA. • TACOMA, WASH.

FOR RAPID, ACCURATE ANALYSES

FISHER Electro Analyzer

Operates Directly on Alternating Current

The Fisher Improved Electro Analyzer facilitates the rapid quantitative determination of metallic elements in solutions. It eliminates the need for expensive, cumbersome motor generators and rheostats, since it is a self-contained unit that operates directly from a 110 volt, 60 cycle, A.C. line.

The Fisher Electro Analyzer will make two similar determinations simultaneously. The voltage and amperage at the electrodes can be varied from zero to 36 watts (a maximum of six volts and six amperes), thus providing ample range to select the optimum current for each particular separation.

This new instrument is also an efficient source of power for electrolytic polishing, charging storage batteries, electroplating and many other applications where direct current within its capacity is required.

The bakelite panel of the Electro Analyzer is engraved and filled with permanent white. The sides of the case are also of bakelite to protect it from fumes and spattering.

Fisher Improved Electro Analyzer, for use with 110 volt, 50-60 cycle A.C., without electrodes or glass stirrer. **Each, $185.00**

Available with Other Modern Laboratory Appliances and High Purity Reagents from:

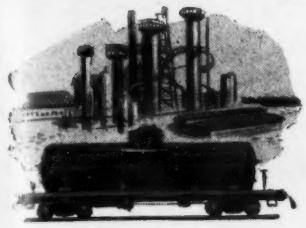
Manufacturers—Distributors

FISHER SCIENTIFIC CO. ⚙ EIMER AND AMEND

717 Forbes St., **Pittsburgh (19), Pa.**
2109 Locust St., **St. Louis (3), Mo.**

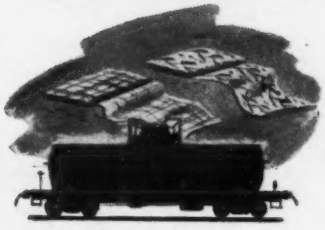
Greenwich and Morton Streets
New York (14), New York

In Canada: **Fisher Scientific Co., Ltd.,** 904 St. James Street, **Montreal, Quebec**



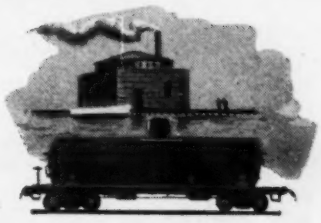
ALCOHOL

Clean, steel car, 6,000 to 10,000 gallon capacity.



CAUSTIC SODA

Heavily insulated steel car, with or without heater coils, 8,000 or 10,000 gallon capacity. Usually specially lined.



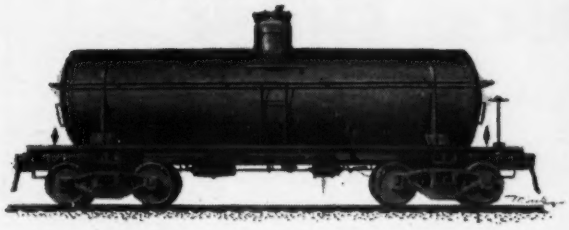
CHLORINE

Insulated, welded car; built to withstand pressure up to 500 pounds; 15 or 30 ton capacity.

COTTONSEED OIL

Clean, steam coiled car of 8,000 gallon capacity.

FOR RENT
TANK CARS



Tank car transportation of liquids in bulk, pioneered by General American has proved its versatility, its efficiency, its economy.

The General American fleet comprises more than 37,000 specialized tank cars . . . 207 different types of tank cars . . . designed for the safe and swift hauling of an almost infinite variety of liquids.

General American's strategically located offices, plants, and repair shops keep these tank cars at your service; provide you with precisely the type of tank cars you want, *when* you want them, *where* you want them.

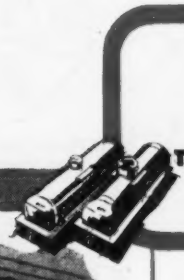
If your problem is the transportation of liquids in bulk, let the nearest General American office help you.

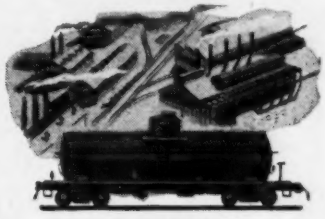
GENERAL AMERICAN TRANSPORTATION CORPORATION

GENERAL OFFICE: 135 South La Salle Street • Chicago, Illinois

DISTRICT OFFICES:

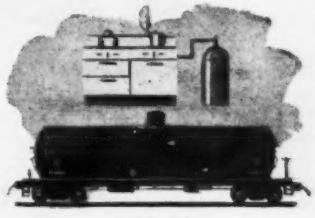
New York • St. Louis • Buffalo • Seattle • Los Angeles • Dallas • Houston
Tulsa • New Orleans • Cleveland • Pittsburgh





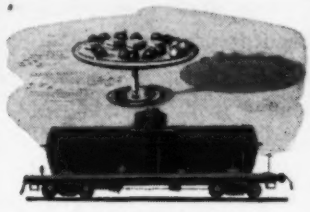
FUEL OIL

Steel car, steam coiled, 8,000 to 12,500 gallon capacity.



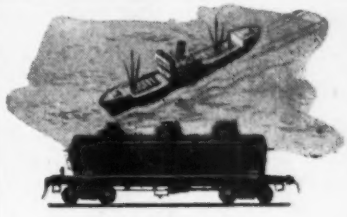
PROPANE

Heavily constructed car, welded and insulated. Built to withstand internal pressures to 300 pounds. Capacity 10,000 to 11,000 gallons.



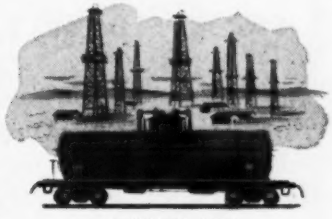
CORN SYRUP UNMIXED

Clean, steam coiled with heavy truck capacity. Usually lined with aluminum paint.



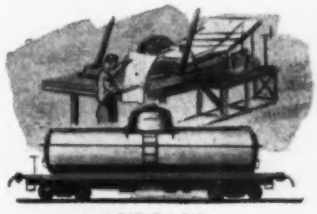
LUBRICATING OIL

Steel car, with steam coils, single or multiple compartment; usually 8,000 gallon capacity.



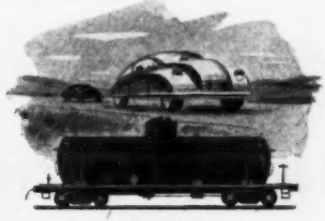
MURIATIC ACID

Car lined with pure or synthetic rubber; 8,000 to 10,000 gallon capacity.



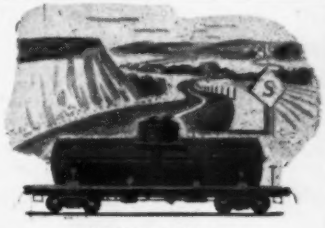
ACETIC ACID

Aluminum Car, 8,000 or 10,000 gallon capacity.



GASOLINE

Clean car, 6,000 to 12,500 gallons; single or multiple compartment.

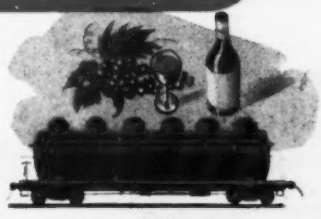


ASPHALT OR TAR

Heavily steam coiled car; with 2 or more inches of insulation; steam jacketed outlet; 8,000 to 10,000 gallon capacity.

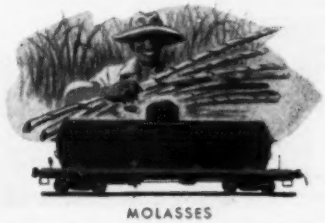
LARD

Clean steam coiled car, usually of 8,000 gallon capacity.



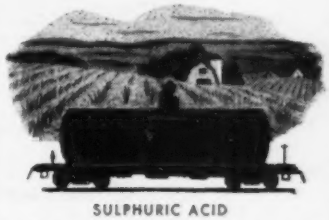
WINE

Insulated car with one to six compartments. Interior coated to preserve quality.



MOLASSES

Steam coiled car with heavy capacity trucks; 8,000 gallon capacity.



SULPHURIC ACID

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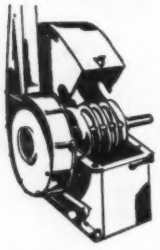
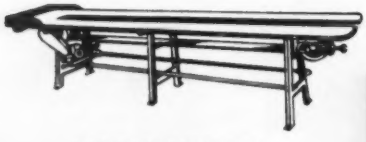


FMC PULVERIZER



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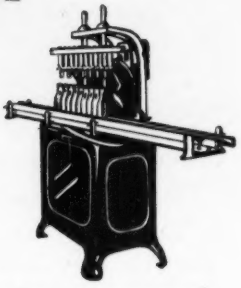
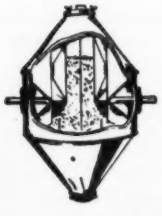


FMC VACUUM FILLER

STAINLESS STEEL EQUIPMENT

FMC STRAIGHT LINE SYPHON FILLER



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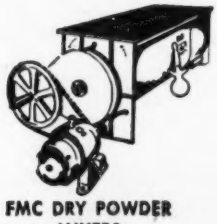

FMC DRY POWDER MIXERS

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CHICAGO COLISEUM

SEPT. 10-14, 1946

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Retrospect and Prospect

THIS MONTH CHEMICAL INDUSTRIES presents its second annual New Chemicals and New Equipment Issue. Experts in various segments of the chemical industry have been asked to review and evaluate the progress in their fields during the past years and to indicate what trends are apparent for the near future. Also tabulated herein are the new offerings of 160-odd equipment manufacturers introduced to the market within the last year, many of which will be on exhibit at the Fourth National Chemical Exposition at the Chicago Coliseum, September 10-14. Close to 400 new chemicals and chemical specialties introduced by CHEMICAL INDUSTRIES' advertisers are also described and will be displayed at CHEMICAL INDUSTRIES' booth at the Exposition.

Such a catalog of progress is truly impressive evidence of the industry's vitality in the face of grievous difficulties. A year ago, when Japan capitulated and peace—such as it is—descended again for a time upon the earth, we were grateful for the halt of carnage and destruction; and with high optimism in the face of formidable problems, we took up the task of reconverting our industries and rehabilitating our economy.

The root of these problems—and in this we are supported by the Old Testament—is the love of money and its next of kin, power.

Directly from this root-of-all-evil stems the danger of inflation, fed by the possibly justifiable demands of labor for wage raises and the naturally ensuing and equally justifiable demands by industry for price increases to offset the higher cost of production. The scarcity of goods and the unparalleled amount of purchasing power looking for goods to buy are additional fuel for the fire. Countering these is the Government's effort, through the O. P. A., to hold the price line by law. The inevitable strife among industry, labor, Government and the public has provoked only confusion and general dissatisfaction.

An obvious result of this bickering is a shortage of both raw materials and manufactured goods. Price ceilings have stopped or diminished to a trickle the influx of many commodities, simply because exporters could do better elsewhere. Strikes have cut at the very grass roots of our production—steel, coal, and transportation. In some industries production has suffered because labor cannot be procured at a cost compatible with the allowable price of the product. It is a plain fact, too, that many potential workers are "unemployed" because they are unwilling to work, and the productivity of those who are working is considerably lower than before the war.

In view of all these factors it is not surprising that manufacturers of chemicals, chemical products and chemical process equipment are finding it impossible to keep pace with orders.

Just as the splash of a pebble in a pond sends ripples to the furthermost bank, so does a strain in one sector of our highly integrated economy endanger the operation of the whole machine. The assembled structure is not as delicate as some of our economic theorists would have us believe, but it is nevertheless true that a change in one of the parts necessitates compensatory changes in the whole.

At the same time we must admit the consequences of the fact that our national economy is integrated to some extent with that of the whole world. Even if, contrary to all human decency, we felt no compassion for the plight of the hapless Hungarians, to name but one of the world's unfortunate peoples, we should still have to take their predicament into account while totaling up our potential export market. It all boils down to the fact that it takes a lot of honest work to repair the damage of wholesale war. It can't be paid for by legislation, manipulation of currency or specious reasoning.

Would that the road ahead were straight and smooth. It is not. It is rough, it is dark, and it is tortuous. We look for prophets who will reveal to us the simple solutions to the vexatious problems confronting not only the nation but the world. Prophets enough there are, and their superficially plausible explanations and easy remedies have won them many converts. But their panaceas are not new. Economic tinkering and political machinations have been advocated throughout history, and they have been tried in vain time and time again.

"You can't get to Heaven in a rockin' chair," says the old spiritual, and it is equally true that we can't achieve our material potentialities unless we take the bit in our teeth. To travel successfully the road ahead will take all the wisdom, all the zeal, all the indomitable fortitude we can muster.

Illustration Courtesy Dow Chemical Co.

Steam emerging from an evaporator for concentration of magnesium at Freeport, Texas.

Chemical Industries
AUGUST, 1946

THE BACKDROP OF CHANGE

by EDGAR M. QUEENY
Chairman, Board of Directors
Monsanto Chemical Company, St. Louis, Mo.

ALTHOUGH THE NECESSARIES OF LIFE are still plentiful in this hemisphere, great changes are being wrought. The effect of the War on man's spirit and the world's economy cannot be measured: harmony between employer and employee has all but vanished; wages increase with the proximity of elections, not with increased productivity; foreign trade has been preempted by the state; and planned economies are supplanting private enterprise everywhere. It is only by realization of the existence of these conditions that it will be possible to avert them.

WE meet today in a strange world, an incongruous world of strange realizations and strange anomalies. Man has made contact with the moon; from California Tech comes an announcement of an engine destined to fly airplanes 2000 miles an hour; other scientific achievements have overtaken the wildest fantasies. But the conquest of her secrets has lessened man's awe of Nature. He evinces contempt for natural laws of human conduct and natural economic laws. He appears confident that he can either ignore them, or supplant them with inventions of his own.

In our hemisphere the necessaries of life are still plentiful; yet on the other side of our planet there is privation and dire want. Everywhere the military has ceased firing, yet everywhere there is conflict. Political changes always follow popular dissatisfactions, and never have so many people in so many lands been so dissatisfied. Nor, indeed, has there ever been a time when there has been so much justification.

Great changes have already been wrought—more are in the making. Even in this land—a land toward which all others cast envious eyes—there are persistent rumblings of discontent and change.

So great has been the impact of this war on man's spirit and the world's economy, we cannot yet appraise its effect nor the losses, except individually in loved ones. And too few of us are concerned with the might and portent of the meanings or with anything other than the availability of nylons or new radios or whether to seek or to attempt to withhold another ten cents an hour.

It is against this backdrop of change that this is written. We shall not traffic in complacencies. Troubles cannot be avoided or solved by ignoring them. To pretend that we are neither harried by events nor greatly confused by them, and that we can lay a sure course through a future we cannot chart and which no pilot knows, would be dishonest. The situation requires candor, particularly as we must venture on where it is going to be necessary to steer by our own lights alone.

But this is not the place to review world conditions, even if we were capable of doing so. And time does not permit more than touching lightly a few perplexing aspects of this strange world which may prove formidable obstacles at home.

LABOR

Uppermost and most immediate is the attitude of American labor. All can now see the prettily sketched pattern of collective bargaining after it has been embroidered by the hand of human nature. The design of fair working conditions and harmony between employer and employed, which all approved, has all but

vanished. And some of the workmanship evidences that Marxian color, a strong acid to the whole, in which any arrangement promising a durable industrial peace is regarded by these particular craftsmen as an undesirable **diluent.**

Not long ago the late Albert Jay Nock pointed out that if self-preservation is the first law of human nature, exploitation—the lust for power over other men and the selfish utilization of them—is the second. The Anti-Trust, Wagner, and other acts curbed their action among businessmen. Now it is evident that labor unions, unrestrained by civil laws, have not been exempt from these natural ones.

Having satisfied their instinct of self-preservation through collective bargaining and seniority, unions, like businessmen when unchecked by civil law, began to exploit. Forgetting that they themselves are consumers, they exploit that group, of which they themselves constitute the greatest single part. So we

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have recently seen labor the greatest victim of labor. Labor's children in St. Louis, for instance, were denied schooling because its school janitors were bound to exploit the community. New York's and Philadelphia's labor could neither work nor play because either the tugboat men or the transport men were exploiting the community. Coal miners, auto workers, and fabricators of steel could not earn livelihoods because the steelmakers sought to exploit the nation. And in innumerable jurisdictional disputes a large number of men have been victimized because a small number vied with another small number for power over them. Thus Karl Marx is mocked—the exploiters themselves are the exploited. Together with other groups, they need civil legal protection against themselves.

But so do other sections of the public. The most disquieting feature of today is public lethargy. Public protests against this exploitation are faint and sluggish. As such a reaction or lack of reaction cannot stem from a bad conscience, it must come from confusion. Having listened so long to lofty utterances evangelizing the gospel of collective bargaining, some may feel that by suffering inconveniences they are participating in the rites of a new faith and helping to right wrongs. Or it may be that the continuous flow of dialectic from our intelligentsia and their fellow traveling politicians has drugged them.

Yet another—a third—law of human nature is operating less noisily in labor unions. The law of parsimony holds that man tends to satisfy his needs and desires with the least possible exertion. As their collective status shelters them from the discipline of competition, American workers are not putting forth as much effort as they did even a decade ago. It is noticeable in our own operations, though we lack a good yardstick. However, Ford officials have stated that their labor efficiency is off 34%. Walker's Building Estimators Book for 1931 lists bricklayers as averaging more than 1000 bricks a day. The estimate used on the building now being erected by Monsanto was 500 bricks a day. From the United States Bureau of Labor Statistics, one gleans that in twenty-four non-war industries decreased efficiency coupled with increased wages raised 1944 labor costs 50% over 1941. This trend bears a depressing resemblance to the operation of this law during several generations of trade unionism in Britain where it is chiefly responsible for denaturing the nation's industrial keystone—its coal industry. In consequence, British homes are cold. British industry's fuel is costly and rationed. And if America is not already sending "coals to Newcastle," she is actually delivering it next door. To follow the same course over here would be progress in reverse! How is it possible for everyone to extract more and more out of the common pool of American production if each contributes less and less? Even Russia avoids this paradox! Listen to Stalin's recent dictum! "Wages depend on productivity; everybody in Russia must work!" It is curiously reminiscent of Nineteenth Century American philosophy—"root, hog, or die!"

WAGES

We meet other strange conditions. As we have seen, wages rise not with increased productivity, as in the past, but with the proximity of elections when such increases are politically expedient. We are indeed living in an economic anarchy. We are no longer governed by laws of supply and demand; they have been proscribed and have gone underground into black markets. And the void has not been filled by subsidies, priorities and directives, ceilings and floors. Consequently we witness the anomaly of lumber shortages and closed sawmills. They have been deprofited! There are thousands of instances wherein high prices, having been outlawed, can't supply their own antidote by inducing new production and increased production Hence, women's stockings and men's white shirts are scarce. Scarcities are so much the rule, I doubt if ever a sentence was more frequently used than the current "You can't get it now."

INFLATION

Production has ever been the only antidote for inflation. I am certain that with the abolishment of O. P. A. and its kindred agencies, price levels a few years from now will be lower. My belief is not actuated by a myopic desire for increased profits. The mode of action I favor differs but my motives are

identical with the professed motives of the administrators of these agencies. The middle class, which includes the majority of our shareholders and the majority of our employes, has the most to lose from a runaway inflation, which always brings in its train grave political agitation—sometimes violence.

Monetary difficulties, including depreciation of colonial paper monies, although seldom mentioned as such, were a contributory cause of our own revolt. The uprising of 1789 cost Louis XVI some prerogatives, but four years later a valueless currency cost him his head.. Germany's inflation of the Nineteen Twenties laid the foundation upon which Hitler built. Indeed, a runaway inflation is the goal of revolutionists. The maxim of that apostle of revolution, Lenin, was "Debauch the currency!"

I often wonder if it is not the demonstrated efficiency of this course which prompts some of the artful casuistry urging government spending, grants, subsidies, or loans as the solution of every problem that arises within or beyond our borders.

It would be madness for men like me to advocate following a path leading to the revolutionists' goal. Enough production to satisfy the supply of money demanding it is the only certain checkmate to inflation. Hence, even at the cost of some immediate price increases, the nation will ultimately benefit by opening wide the spigots of production, eliminating all obstructions, voiding artificial restraints imposed by the regulatory agencies, and avoiding, by all fair means, all strikes, lockouts, and slowdowns, by either labor or management.

But this idea is neither original nor novel. Relatively free of unnatural restraints, the economies of many nations survived similar aftermaths of war and have lived to fructify. I fear, however, that this course will prove non-competitive with the splendor of the idea of managing the "period of reconversion" through administrative agencies—which also is neither original nor novel.

It, too, has been often tried and has as often failed. The magnitude of the economic problems, multiplied by the baffling qualities of human nature, always proved beyond the competency of men to solve, even in situations far less complicated than our own.

It has been said that history is like the Bible inasmuch as it provides apt texts for any sermon. But those who propose to avoid inflation by managing our economy avoid history, for good reason. It is replete with records of similar attempts and their disastrous failures. However, history supplies many apt texts to preach that the concomitant of an ever-increasing national debt is a decline in that nation's fortunes; that its sequel is often a violent change in its polity, as well.

FOREIGN TRADE

Today's foreign trade, too, assumes a strange and changing aspect. It no longer follows the traditional late Nineteenth Century pattern of commerce between individuals in one nation and those of another. Tariffs were the only obstacle to such trade. But tariffs are no obstacle when a state preempts trade and pays tariffs to itself. It becomes a minor one when states impose import quotas, license foreign exchange, or subsidize their own producers. Even more menacing to private international trade is state ownership of production, when for each state foreign trade becomes an instrument of foreign policy. Quality, price, and other criteria which determine the course of international commerce among individuals lose their meaning when a state can give or withhold the patronage of a nation to influence the politics of another. Then internal costs need bear no relation to prices asked abroad. Losses are absorbed by the state.

PRIVATE ENTERPRISE

Despite the brave efforts of some factions of the Administration to halt the trend, outside of the Western Hemisphere planned economies are supplanting private enterprise everywhere; and, in very great areas, ownership of most or all of the means of production is no longer in private hands. Until other nations recover and as long as we are willing to lend the purchase price to anxious buyers, America will export. But when foreign shelves are filled and when foreign states have rebuilt their industrial structures and enter world markets, our system may be sorely tested.

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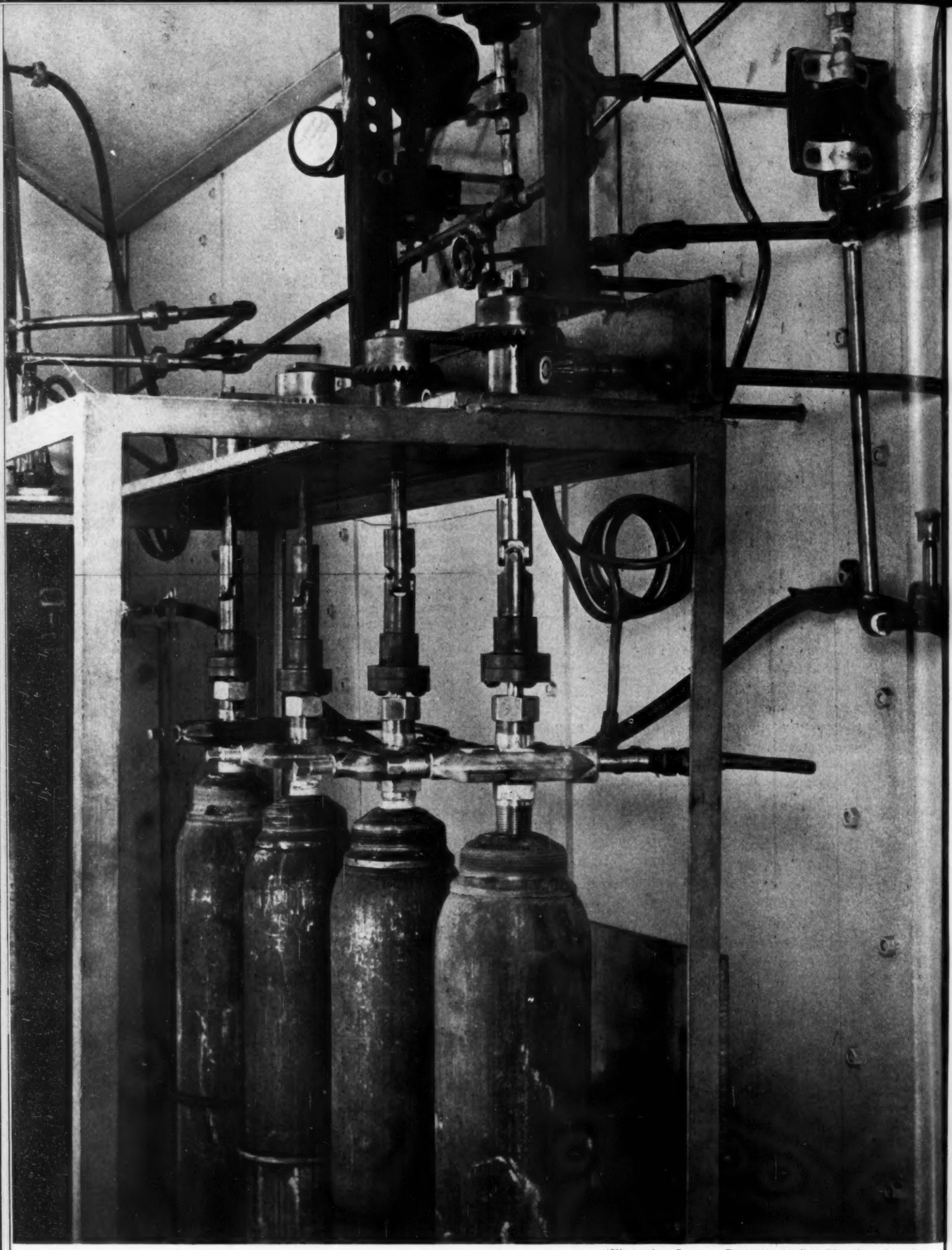
And it is through this maze, of which we have viewed only a part, that American private enterprise, if it would not perish itself, must thread its way, slay the Minotaur of unemployment, and produce the better world which the politicians have promised and which its own advertising agencies have heralded.

The foregoing may justly be regarded as a jaundiced view, but the consequences of the strange moods and circumstances I have touched upon will prove of far greater import to industry than whether last year's earnings or taxes were a million more or less. However, the problems we face are dwarfed by those of Europe. We are relatively fortunate.

The future certainly contains all the elements comprising the meaning of a word which must be tired from overwork—challenge. But the American temper and genius, molded during a century and a half of individualism, built a dynamic industrial structure which has great momentum. It may be able to hurdle all obstacles to complete its tasks of peace as it hurdled obstacles to complete its tasks of war.



(Illustration Courtesy Pennsylvania Salt Manufacturing Co.)

Fluorine defied isolation in commercial quantities for sixty years, but is now available for research. Here it is being packed into steel cylinders at 400 lbs. pressure.

Postwar Research Forges Ahead

NOW THAT the pressure of turning out military goods is past, chemical manufacturers are again going into the laboratory to find new or improved products and processes. Farther on in this issue is a compilation of some 400 new chemicals and chemical specialties not heretofore described in previous listings of "New Chemicals for Industry." A few of these, perhaps, have been developed since the war, although it is unlikely that many could have been brought to pilot-plant stage within a year. Another group was born of wartime necessity, and secrecy orders have only now been removed. The largest group, undoubtedly, was initiated before the war and lay dormant until hostilities ceased. Now they are coming out.

The sellers' market will soon be over, and in the competitive days ahead the race will go to the strong—and in the chemical industry that means the imaginative and research-minded. Not one of these 400 new products, or the other products or processes described below, fell from the sky; all of them came into being through the exercise of that vigorous imagination and initiative which is characteristic of the American chemical industry.

CHEMICAL INDUSTRIES has asked experts in the various fields of chemistry to discuss and evaluate the developments in their bailiwicks during the past two years. These advances are straws in the wind, indicating to the perspicacious reader the direction in which the chemical industry is moving.

INORGANICS

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ATOMIC fission and synthesis of the trans-uranium elements are by far the outstanding achievements of the physicist and inorganic chemist within recent times.[1] However, the ramifications are so vast and so much has already been written that further comment is not possible here. Aside from this, both research and commercial developments in inorganic chemistry show considerable activity in organic-inorganic combinations and an increasing appreciation of the possibilities of the more complex inorganic forms analogous to the trend toward polymer chemistry in the organic field.

ACIDS AND HEAVY CHEMICALS

In spite of a three-fold wartime expansion, conventional processes, for the most part, have been used[2]. However, the increased demand for HCl gas led to processes involving chlorosulfonic acid[3] or dehydration of aqueous muriatic acid with calcium chloride. Anhydrous compressed HCl became commercially available[5]. Chlorine capacity was greatly expanded[6], the electrolytic method being used exclusively except for Solvay's nitrosyl chloride process[7]. Other routes to chlorine, such as the reaction of SO_3 with NaCl, were investigated but did not reach commercial production[8]. In Germany, a mercury cell was developed to yield 50% caustic directly without evaporators[9]. The production of sodium chlorite has made possible the use of chlorine dioxide as a bleaching agent[10]. Caustic soda has been purified by extraction with liquid ammonia[11]. The production of pure sodium sulfide[12], the manufacture of sodium sulfite by a method similar to the ammonia-soda process[13], and new syntheses for thionyl chloride[14], sodium chlorosulfonate[15] and fluosulfonate[16] should be mentioned. Developments in phosphorus chemistry will probably be accelerated by the large existing capacity for the production of this element. Sodium pyrophosphate is being used in soaps in increasing volume[18]. Increasing attention is also being given to the use of organic compounds of phosphorus in the plastics, petroleum, and textile industries[19]. A potentially low-investment process for nitrogen-fixation may come from experiments involving direct synthesis of nitric oxides from air in a fuel fired unit[20]. Hydroxylamine salts[20a] as well as hydrazine hydrate are now commercially available[20b]. The production of 85% stable hydrogen peroxide on a commercial scale has been a notable achievement[21]. Sodium peroxide has been shown to be an economical and unusually effective bleaching agent for groundwood pulp[22].

METALLURGY

Improved methods of recovering alumina from siliceous ores have been worked out[24]. Nickel has been recovered by an ammonia-air leaching of reduced ore[25]. New processes for magnesium metal, involving reduction of MgO by carbon[26] or ferrosilicon[27], have been technical wartime triumphs. Calcium metals can also be produced by reduction of CaO with ferrosilicon[28].

Lithium, calcium, and boron hydrides[29] have been developed as convenient sources of hydrogen. Sodium hydride, generated from sodium and hydrogen in a molten caustic bath, is being used for de-scaling various types of steel, particularly stainless, as well as such metals as nickel, cobalt and copper[30].

LESS COMMON ELEMENTS

Fluorine chemistry is developing rapidly, as evidenced by the widespread use of hydrogen fluoride as a catalyst in the petroleum industry[31], the development of new highly-inert, thermally-stable organic fluorine compounds[32] and polymers[33], and the commercial-scale generation of elemental fluorine[34].

In boron chemistry, much of the work is not yet published, but the commercial availability of boron trifluoride-ether complex[35], salts of fluoboric acid[36], and unique borane salts such as $Li \cdot BH_3$[37],

indicates considerable activity. The technology of beryllium[38], and new uses for lithium compounds, such as the stearate in greases[39], are also of interest.

An important improvement has been the production of the anatase rather than the rutile form of TiO_2 as a superior white pigment[40]. The unusual dielectric properties of titanates also make these compounds of interest in the electrical industry[41]. Zirconia will become increasingly important as a refractory for temperatures above 3500°F.[42]. Germanium is finding use as a rectifier for ultra-high frequencies[43] while cerium oxide is being employed for polishing optical glass[44].

GLASS AND CERAMICS

The outstanding technological advance in this field has been the combination of glass fibers with organic plastics to yield strong readily-fabricated laminates[45]. Other important developments include improved types of optical glass, non-reflecting finishes for glass, insulating materials made of foamed glass, a new type of glass resistant to HF, and a temperature-resistant high silica glass[46].

INORGANIC COLLOIDS

Unusual properties are exhibited by common inorganic materials when converted to a finely-divided or colloidal state. For example, very finely-divided calcium silicate, alumina, and silica appear to be making headway as reinforcing rubber fillers[47]. New forms of silica gel such as the adsorbent type[48] and dispersible hydrated silica[49], are under study. Stable colloidal solutions of silica can be made by removing sodium ions from sodium silicate by various methods,[50] or dispersing silica gel by traces of alkali[51].

COMPLEX STRUCTURES

Only recently has it been recognized that silicate minerals bear certain analogies to organic polymers[52]. Clarification of the structure of clays, asbestos, and mica is an important objective[53]. Synthetic mica has been made experimentally in Germany[54]. It has also been found that certain silicates have a uniformly small pore structure which permits separation of small from large hydrocarbon molecules[55]. The use of silicates as fluid flow catalysts or catalyst bases in the petroleum industry is a major development[56].

ORGANO-INORGANICS

The silicones have overshadowed all other developments in this field[57]. Other advances include the use of silicic esters in plastics[58], cements[59], and as heat transfer fluids[59a]. A practical method of producing esters of silicic acid from sodium silicate has been found[60]. New techniques have been devised for separating soluble silicic acid from acidified solutions of sodium silicate by organic solvents.[61]

Progress is being made in finding practical applications for the long-known Werner complexes. An interesting method of isolating oxygen involves adsorption from air on a haemoglobin-like cobalt salicyladehyde complex, whence it can be removed by gentle heating[23]. The complex zinc and iron salts of dithiocarbamic acid are being exploited as fungicides[62]. Complex nickel salts are being tested in wood preserving[63]. Complex formation with calcium and magnesium appears to explain the water softening action of the various sodium polyphosphates[64]. Complexes of titanium are reported useful in dyeing[65]. A water-soluble stearate-chloride complex of chromium gives a water-repellent finish on paper[66] and insolubilizes starch[67] and proteins[68].

In conclusion, increasing attention is being given to the combination of inorganic with organic materials in colloidal dispersions. The combination of organic salts of lead with bentonite gives an insoluble film-forming substitute for mica[69]. Magnesium silicate is patented as an emulsifying agent for oil[70]. Organic salts are disclosed as dispersing agents for silica in organic solvents[71]. A specially prepared iron oxide in lacquers yields unusual luster effects[17].

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SYNTHETIC ORGANICS

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THE PAST few years have witnessed a great expansion of synthetic organic chemistry into new fields that parallel and, in some instances, replace established natural products. Fuels and lubricants synthesized from natural gas and petroleum fractions, for example, are appearing in the news more and more frequently. Some of these were developed to fill war needs, such as alkylate and other aviation gasoline constituents synthesized from refinery gases; others developed before the war found important applications before hostilities ceased.

SYNTHETIC LUBRICANTS

The "Ucon" lubricants synthesized from natural gas are an important group now being marketed. Manufactured in two types—water-soluble and water-insoluble—they are finding increasing use for lubrication of internal-combustion engines, compressors, electric motors, and for general industrial lubrication. The water-soluble types are useful as textile lubricants. Another outstanding group of synthetic lubricants are the silicones used as instrument oils, for the preparation of special-purpose greases and as anti-foam agents for lubricating oils derived from petroleum. Certain synthetic organic esters are also being offered as instrument oils and for the preparation of greases having excellent low-temperature characteristics. In common with both the silicone oils and "Ucon" synthetic lubricants, these esters show extremely small change in viscosity with changes in temperature, and have extremely low pour points.

SYNTHETIC FUELS

Synthetic gasoline having a high-octane rating is now being produced in a pilot unit from natural gas by a modified Fischer-Tropsch process. Diesel fuel of high cetane number and superior fuels for jet engines can be produced by the same process. A larger plant is now being built in Texas. Petroleum technologists are predicting that the best fuels and lubricants of the future will be synthetic.

BIOLOGICS

Another significant trend has been the dramatic development of new markets for synthetic organic chemicals in biological fields. The commercial importance and diversity of these new markets is illustrated by the use of "Atabrine" as a synthetic anti-malarial, DDT as a contact insecticide, dichlorophenoxyacetic acid as a weed killer, chlorinated propylene mixtures as soil fumigants, ethylhexanediol as an insect repellent, benzyl benzoate as a clothing impregnant against mites, metaldehyde as a snail bait, and phenothiazine as an anthelmintic. Many of these biological developments were catalyzed by war research and war demands, and most of them will continue to prove important in peace.

Many more organic chemicals have recently been found to have interesting biological uses that may attain commercial importance during the next few years. Among such compounds are hexachlorocyclohexane, a better insecticide than DDT against some pests, with special promise for the control of the boll weevil; sodium trifluoracetate and α-naphthylthiourea, highly effective rat poisons replacing zinc phosphide, red squill and thallium sulfate; *o*-phenyl cyclohexanol and dimethylendomethylene tetrahydrophthalate, mosquito repellents of some promise; disodium ethylene-bis-dithiocarbamate, metal salts of dimethyl-dithiocarbamate, lauryl isoquinolinium bromide, phenyl mercury triethanolammonium lactate, dichloronaphthoquinone, polyethylene polysulfide, and heptadecyl glyoxalidine—all of interest as foliage fungicides to control such diseases as apple scab and late blight of potatoes and tomatoes; the salts of propionic acid and undecylenic acid, active ingredients of athlete's foot remedies; dihydroxydichlorodiphenylmethane, a mildew-proofing impregnant for textiles that competes with copper naphthenate and copper 8-hydroxyquinolinolate; chlorinated polynaphthalenes and complex derivatives of piperonal, active insect toxicants; triethylene glycol, a bactericide for aerosol control of airborne diseases; ethylene dibromide, an effective soil fumigant for wireworms; acrylonitrile, an efficient fumigant for grain and other stored products; ethylene oxide, a gaseous sterilizing agent for fruits and other foodstuffs; and phenyl "Cellosolve," a quick-acting toxicant for head lice and fleas. These compounds herald the beginning of a new decade of rapid biological development.

NEW UNIT PROCESSES

Many advances in the adaption of existing unit processes for chemical production have been made during the last two years. Although these processes do not necessarily represent new reactions from a chemical standpoint, they can be reasonably considered as new unit processes. The more significant of these might be summarized as advances in oxidation, chlorination, fractionation, and high pressures.

Production of acetaldehyde from propane and butane by direct oxidation has proved successful, and production by this method was begun this year. Glyoxal for use in the dimension stabilization of spun rayon fabrics is about to be produced by large-scale oxidation processes. A process involving the catalytic oxidation of ethylbenzene and subsequent dehydration of methyl phenyl carbinol produced substantial quantities of styrene for use in the synthetic rubber program. Processes for producing peroxides from various constituents of petroleum have been developed, and one company has recently succeeded in preparing hydrogen peroxide for commercial use in stable concentrations up to 90 per cent. Liquid organic peroxides are useful in fuels for jet propulsion.

The direct chlorination of ethane to yield ethyl chloride and ethylene dichloride and the chlorination of propylene to produce three-carbon chlorinated hydrocarbons for use as soil fumigants has recently started. Allyl chloride for making resins and pharmaceuticals is being produced by chlorination, and allyl alcohol, of growing interest as an intermediate for low-pressure, laminating resins, is being made by an isomerization process. Among other recently developed chlorinated compounds of general interest is, of course, DDT which involves the large-scale chlorination of ethanol to form chloral.

Great strides in plant-scale distillation techniques are now being made. Pure heptane and cyclohexane are being offered, and the use of molecular stills for the distillation of high-boiling plasticizers will undoubtedly result in the commercialization of many new products with extremely low volatility characteristics.

The production of synthetic methanol was greatly increased during the war to provide for wartime needs of formaldehyde and its derivatives. This expansion was greatly facilitated by the use of excess ammonia production equipment throughout the country. The German "Oxo process" for adding carbon monoxide to aliphatic olefins has been of considerable interest, although the raw material situation in Germany made the process of greater importance there than in the United States.

A method of separating isotopes by chemical exchange has permitted the production of "heavy" carbon, which has already shown great value in tracing the processes of the human system and will undoubtedly be useful in clarifying mechanisms of many reactions important to industry, medicine and agriculture. Direct amination of refinery gases on a pilot-plant scale has recently begun to produce acetonitrile, acrylonitrile, isopropyl and n-butyl amine. Pentanedione-2,4 is now being produced commercially for synthesizing the pyrimidine ring of the new sulfa drug, sulfamethazine. Pilot-plant quantities of sorbic acid (2,4-hexadienoic acid) have recently been announced, which

should be of great interest to chemists specializing in synthetic organic chemistry.

The widely publicized Reppe processes involving the chemistry of acetylene have created considerable interest, especially in methods for handling acetylides and acetylene under high pressures with reasonable safety. Supplies of vinyl ethers have been announced.

The general shortage of coal-tar chemicals in the United States has resulted in a shortage of plasticizers and has led to the use of complex higher glycol derivatives as replacement for vegetable-oil types, and to the use of such aliphatic acids as ethylhexoic acid to replace phthalic anhydride.

COAL-TAR PRODUCTS

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RECENT product and process developments are significant from the standpoints of diversity and importance to national well-being. Benzene is normally consumed in larger quantities in the chemical industry than any other coal-tar chemical. Therefore, it is not surprising that many new advances in coal-tar derivatives require benzene as a basic starting raw material. Notable among these new products are 2,4-dichlorophenoxyacetic acid, weed-killer extraordinary, and hexachlorocyclohexane, a very potent insecticide. Dichloro-diphenyl-trichloroethane (DDT), a wartime achievement, is now available to the general public.

Shortages of fats and oils have created a large market for synthetic detergents derived from alkylated benzenes. Large amounts of styrene are available at a low cost for use in the plastics and allied industries as a result of the wartime synthetic-rubber program. Polyethyl benzenes and 1-vinylcyclohexene-3 are obtained as coproducts. Chlorostyrenes are being marketed for use in the plastics industry. Divinylbenzene is used in certain manufacturing processes to improve the properties of synthetic rubber. Alkyl benzene and toluene sulfonamide plasticizers are now available as well as new derivatives of such substances as cyclohexane, cyclohexanone, cumene, biphenyl, hydroquinone, and phenoxyethanols.

Methylstyrenes, from natural and synthetic sources, have been commercialized for use in the manufacture of plastics. One producer is manufacturing indene on a pilot-plant scale. Benzyl benzoate is a very effective insecticide for chiggers. Commercial production of other new benzoates and derivatives of benzoic acid have been announced. Sodium xylenesulfonate is now available from semi-commercial production.

A plant for converting naphthalene into phthalic anhydride by a new process, employing a fluid catalyst, has been placed in operation. Tetraphthalic acid and 4-sulfophthalic anhydride are new commercial chemicals. Dimethyl phthalate has found important applications as an insect repellent and miticide. Monomethyl- and dimethylnaphthalenes are now being widely used as insecticides and solvents for DDT. Alpha naphthaleneacetic acid is finding increasing use as a plant hormone.

The tar acids; *m*- and *p*-ethylphenol; 1,3,5-methylethylphenol; 1,2,4-; 1,3,4-; and 1,4,2-xylenols, are now available for use by industry. Various new phenylethylphenols and amylphenols are being made in experimental or commercial quantities. Koresin, a t-butylphenol-acetylene condensate utilized by the Germans as a tackifier for synthetic rubber, is being produced in this country. A process has been developed to produce relatively pure *m*- and *p*-cresols from a mixture of the two isomers by butylation and subsequent debutylation.

TAR BASES

Intensive research on tar bases has resulted in the commercial separation of additional bases and the manufacture of new intermediates and coal-tar products. Isoquinoline, lepidine, 2,4-lutidine, and 3-methylisoquinoline are among the more important new bases now being recovered from coal tar. New intermediates include various alkanol-, higher alkyl-, and aminopyridines. Lauryl isoquinolinium bromide and pyridylmercurics are representatives of the new coal-tar products derived from tar bases. These derivatives are being utilized as fungicides. The compound, 8-hydroxyquinoline, is now being produced commercially by the sulfonation of quinoline. Copper 8-hydroxyquinoline is a mildew proofing agent for textiles.

Commercial production of two N-alkylated carbazoles, pyrene, and chrysene has been recently announced. Tetranitrocarbazole has been utilized in Germany as a pest-control agent and may find similar use in the United States. Scientific reports on the German coal-tar products industry, already released and to be made available, may accelerate the production of new products and the adoption of new processes in this country that were developed abroad.

This brief review of coal-tar products reveals that a number of new commercial chemicals have been recovered from coal tar. Furthermore, product and process developments with these and existing coal-tar chemicals have made possible the production of many new intermediates and finished products. These derivatives are utilized by basic industries that have materially added to our welfare.

NAVAL STORES

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THE NAVAL stores industry during the past several years has been faced with many difficult problems. During 1944 and 1945 and to a considerable extent even today, production of wood and gum naval stores has been restricted because of labor shortages and nonavailability of materials required for construction and maintenance of producing equipment. Stocks of rosin and turpentine accumulated in former years became exhausted with the result that available supplies were limited to current production. Allocation under W.P.B. of rosin, pine oil, and monocyclic terpenes to essential war and civilian uses made adequate supplies available for such uses, but created a serious problem for consumers of these products in industries classified as nonessential. Removal of allocation prior to or following cessation of hostilities placed the burden of distributing inadequate supplies in the hands of producers.

GREATER SUPPLY AHEAD

At the end of the 1945-46 naval stores producing season on March 31, 1946, stocks of rosin, turpentine, pine oil, and monocyclic terpenes were almost at record lows. Production of gum naval stores during the season ending March 31, 1947 is expected to be 15 to 20 per cent above production during the season ending March 31, 1946.

Increased production of wood naval stores will be made in 1946 and a further increase in 1947. New plants for the production of wood naval stores will be put into operation during 1946 by Crosby Naval Stores Company and Gulf Naval Stores Company. Hercules Powder Company has already completed additions to existing plant capacity. Newport Industries, Inc. expects to have a new plant in operation during the early part of 1947. This total increase in production of wood naval stores is expected to be about 40 per cent, which will bring the volume of wood naval stores considerably above the anticipated production of gum naval stores during the next two years. This antici-

pated increased production should largely eliminate current shortages of rosin, pine oil, and turpentine but will probably not be effective before well into 1947.

There have been several noteworthy developments in the naval stores industry during the last several years. The increasing use of acid stimulation to increase the flow of gum has helped considerably to maintain production of gum naval stores in the face of inadequate labor in the producing areas. The growing use of large central distilling units with improved equipment has improved the quality of gum rosin and gum turpentine and reduced production costs. Some large producers of gum rosin are now making such products as limed rosin, ester gum, rosin-modified maleic resins, and rosin-modified phenol resins and shellac substitutes. A growing trend in this direction may be anticipated. Fractionation of gum turpentine into α-pinene and β-pinene is contemplated by some producers.

PINENES AND PINE OIL

The use of α-pinene derived from wood turpentine for the production of additives for lubricating oils is a relatively new development. Large quantities of α-pinene are now being used for this purpose and expanded future requirements are forecast. The use of β-pinene for the production of resinous polymers is well established and expected to increase considerably in the future. The use of α-pinene for the production of synthetic resins is promising. A considerable quantity of α- and β-pinene is now being produced from sulfate turpentine, largely by two of the wood naval stores producers. Requirements of α-pinene for production of synthetic camphor have increased as a result of the opening of export trade and requirement of α-pinene for production of synthetic insecticides is expected to increase in the future.

Requirements for pine oil remain greater than available supply in spite of large scale production of synthetic pine oil during the entire war period and up to date. Increased production of wood naval stores is expected to relieve this situation somewhat but probably will not permit adequate exploration of new uses. Terpene ethers derived from turpentine have been found superior to pine oil for certain uses but their higher cost limits their use to highly specialized fields. Larger demand for pine oil is expected in the export field for flotation, textile chemicals, essential oils and detergents.

Use of dipentene for the production of isoprene for synthetic rubber manufacture was initiated by Newport Industries, Inc. during the war. The high cost of isoprene from this source points that peacetime production will not be practical. Demand for monocyclic terpenes for reclaiming rubber continues to be slightly in excess of available supply and is expected to increase as reclaiming of synthetic rubber increases. This heavy demand from rubber reclaimers has largely stifled other uses. Menthylphenol made from dipentene as a primary raw material has been developed as a stabilizer for ethylcellulose and will probably find other commercial uses. Sulfurized monocyclic terpenes were developed as oil additives during the war and their use for this purpose in peacetime is expected to continue. Use of dipentene and other monocyclic terpenes for the manufacture of synthetic resins is expected to resume and possibly expand now that allocation has been removed. Conversion of monocyclic terpenes to *p*-cymene was abandoned during the war period but may be expected to be revived as supplies become more available. Several derivatives of *p*-cymene have interesting peacetime possibilities. Use of dipentene as a solvent in protective coatings practically ceased during wartime allocation but is expected to be revived to a large degree as supplies become available. The anticipated increase in production of wood naval stores will make larger supplies available, but demands in the export field are now developing and may be expected to keep monocyclic terpenes in relatively short supply.

ROSIN

Rosin is in good demand in spite of shortages of other materials used in processing it to produce varnishes and synthetic resins. Shortages of drying oils, maleic anhydride, glycerine, and pentaerythritol have considerably curtailed the use of rosin; however, expanded use of rosin, modified rosins and rosin-modified synthetic resins in other fields have been sufficient to maintain it and its derivatives in relatively short supply. The production of hydrogenated rosin is not adequate to supply demand but further utilization is dependent on increased production which has not yet been provided. Production of polymerized rosin is not adequate to supply demand but increased production now contemplated should partially alleviate present shortage.

Perhaps the most noteworthy development in the industry is the production of a special grade of disproportionated wood rosin for use as a replacement of fatty acids in the emulsion polymerization of butadiene-styrene to make what is known as GR-S-10 synthetic rubber. Because of the better processing properties, better resistance to heat build-up, and lower flex cut growth of GR-S-10, its use is expanding rapidly and will provide an important outlet for this new rosin derivative. Other uses for disproportionated rosin in soap, linoleum, other emulsion polymerization systems, and as a chemical intermediate, should require large quantities.

A new product in initial stages of development is a rosin amine made from a special rosin. This primary amine has shown interesting possibilities in a number of industrial fields and is expected to become an important outlet for rosin.

While many wartime uses for Vinsol Resin, a product of the wood naval stores industry, have shrunk, yet the present high price and short supply of shellac has resulted in a greatly increased demand for plastics made from Vinsol Resin. It is used in phonograph records, shellac substitutes, paper coatings, extender for phenolic resins, in air-entraining cements, and many other places.

RESEARCH

The growing importance of research in the naval stores industry is illustrated by the fact that Newport Industries, Inc. and Crosby Naval Stores Company are building new research laboratories which will represent an investment of over $500,000. Also research by Hercules Powder Company in this field continues at an unabated rate. Research for the benefit of the gum naval stores industry by the U. S. Forest Service and the U. S. Department of Agriculture Regional Laboratories has and will continue to aid in reduction of costs, improvement of quality of products and development of markets for them. The effect of research work sponsored by the wood naval stores producers can be seen in the rapid strides made in recent years both in development of new uses for and new derivatives of resinous and liquid products obtained from waste pine wood. Completion of plants now under construction will provide production capacity of wood naval stores in excess of the average normal production of gum naval stores, but this bold step would not have been possible without the background of years of work and millions of dollars spent on research.

PHARMACEUTICALS

by E. H. VOLWILER,
Vice-President
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THE STUDY of biologic processes, together with the development of products to influence them, has assumed a constantly increasing importance in modern research and industrial effort. The results of this became increasingly evident during the war, and further development during that period, together with research and production at an accelerated rate during the past year, have indicated that the trend is being extended still further.

Several outstanding new types of drugs of synthetic and biologic origin have made

their appearance during the last two years. Marked advances in research, development, and manufacturing have occurred during this time.

The production of penicillin has increased so rapidly during the last year that essential domestic needs are being fully met. However, production in other countries is limited, Great Britain being the only one which is manufacturing appreciable quantities. The world demand is, therefore, still unsatisfied to a large degree and is likely to remain so for some time. U. S. production is now exceeding 2 trillion units per month. The potency varies from 500 to 1400 or more units per milligram. The structure of penicillin has been fairly well established, but a commercially feasible synthesis has yet to be discovered.

Streptomycin has been studied intensively by clinicians and it has been found of definite value in certain infections due to gram-negative bacteria, including meningitis, urinary tract infections, bacteremia, and peritonitis. It has given excellent results in tularemia, and its value in tuberculosis is still uncertain. Streptomycin has not yet been produced in large amounts, but the quantity is increasing. The structures of fragments of the molecule are known, and this knowledge indicates that the synthesis of the compound is unlikely in the near future.

ANTIMALARIALS

The war greatly increased the interest in tropical diseases and it accelerated research aimed toward the development of improved drugs for their treatment. The clinical investigations of the best of the approximately 15,000 compounds screened as antimalarials are now being completed and it appears that at least two represent definite improvements. One of these, SN-7618, which has been named "Chloroquin", is an effective suppressive agent, and another, SN-13276, an 8-aminoquinoline derivative, is promising as a curative agent. The British meanwhile have developed another promising suppressive drug called "Paludrine". Progress has also been made in the use of new compounds for the treatment of rickettsial infections, arsenicals for African sleeping sickness, and antimonials for schistosomiasis.

The favorable results obtained by the Army in the use of the new influenza vaccine have led to its introduction for civilian use. In the field of anticonvulsants the new drug Tridione is producing favorable results in the treatment of the petit mal type of epilepsy. The old compound thiouracil has found a new use in the treatment of hyperthyroidism. There has also been much interest in drugs to relieve spasm of involuntary muscle, the newest effective member of this series being Amethone.

Much wider use of intravenous anesthesia has developed, the principal drug employed being Pentothal Sodium. Drugs of this type provide ready portability and freedom from explosion hazard, together with convenience of control and administration. In connection with anesthesia, as well as for other purposes, the old alkaloidal arrow poison, curare, has recently assumed high importance as a drug. All of the supplies, which must be carefully collected, come from the aborigine Indians in Equatorial South America.

ALLERGY

In view of the large number of persons suffering from some form of allergy, the tempo of research in this field has materially increased. One resulting compound from these studies which is giving some promise is Benadryl, used in the treatment of urticaria, hay fever and asthma, and serum reactions. Clinical investigations with amino acid mixtures and protein hydrolysates indicate the importance of these products in wound healing and convalescence, particularly in cases where natural food can not be given. A great deal of research in both industrial and university laboratories is being directed toward the improvement of these products, and several are already available.

Many new techniques are now finding extensive application in the development and manufacture of drugs. Involved in this are superior engineering, more effective use of development laboratories, drying under high vacuum, high pressure techniques, new methods of solvent extraction, chromatography, the use of new solvents, and improved plant design.

During the war the essential requirements of the military forces, as well as of civilians, were adequately supplied. Since that time both domestic and export requirements have increased materially, and shortages in such articles as corn products, glycerin, sugar, and animal glands have developed to an appreciable degree.

EXPORT

With the active encouragement of the U. S. Department of Commerce, drug exports, aside from military requirements, have materially increased. During the war, export drug sales trebled. In 1945 they amounted to 116 million dollars, or 7 times as large as in 1938. The newer drug products were responsible for much of this increase, including particularly the vitamins, penicillin, sulfa drugs, and quinacrine.

The Department of Commerce has set a normal export goal of 100 million dollars per year for all drug items. The United States is today well in the lead as a drug producer and exporter. The more important pre-war exporting nations, particularly Germany, are no longer in a dominant position and, based upon the extensive and effective research now being carried on in the United States, there are excellent prospects of maintaining and extending our export, as well as domestic position in this field.

PLASTIC MATERIALS AND POLYMERS

by ROBERT J. MOORE,
Technical Coordinator
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THIS EXTENSIVE field has enlarged its scope so much in recent years that we can touch on but a few of its developments in an article of this scope. The field of synthetic resin plastics includes significant new developments in such diverse subjects as molding materials, laminated products, cast resins, adhesives of both thermoplastic and thermosetting types including plywood glues, organic coatings, electrical insulation plastics, resins for modifying paper and textiles, and dozens of other types. Included are the wide variety of recent developments in both flexible and rigid sheets, foils and films. We are omitting, for the present, reference to the synthetic rubbers and artificial fibers—although both are comprehensive ramifications of the high polymer industry.

The significant new developments in plastics[1] are the result not alone of new resins, but also of new manufacturing techniques, such as, for example, emulsion polymerization, and new types of fabricating procedures as illustrated by low-pressure and contact-pressure laminating.

Among the chemical resins which have led to new techniques in plastic manufacture may be mentioned the following: The extensive field of low-pressure laminating, which enables the industry to use pressures of less than 400 p.s.i. instead of over 2000 and which allows the use of inexpensive mold materials, was made possible by new control and modification of the phenol-formaldehyde reaction. Through this technique much larger moldings are possible, such as boats, wash tubs, etc. Another method uses polyester-styrene combinations which, with catalysts, yield contact-pressure laminates first used as Radomes in the war. The polyester part of the resin may be allyl phthalates, maleates, etc., or various combinations of glycerol or glycols with polybasic acids. This low-pressure technique, which gives paper-base and glass-cloth laminates of

[1] cf. "Recent Significant Developments in Plastics," R. J. Moore, *Mechanical Engineering* **68**, 531, June 1946.

outstanding strength properties, and allows the use of the so-called rubber-bag molding, appears to present a significant development.

NEW MATERIALS

Further developments in plastics from the chemical resin viewpoint include the following:

Polyethylene.—Improvements in manufacturing technique and processing point to considerable development in the use of this, the most chemically resistant and electrically stable hydrocarbon resin, for insulation and moisture resistant moldings and extensions. Developed to meet urgent electrical insulation problems in the use, it has enabled us to take full advantage of electronics and is setting new standards in insulation for high frequency applications. It must be considered one of the important new trends in plastics.

Styrene.—The excellent molding and insulation properties of polystyrene known in recent years were extended by the application of the monomer in the contact-pressure laminates mentioned previously. The 400,000,000-lb. plant capacity, developed for synthetic rubber needs, presents an impressive potential raw material source. In addition there are now available, or in the development stage, several copolymers with other hydrocarbon- and nitrogen-base resins, as well as halogen derivations which offer improved physical properties for certain uses. As an example, higher heat-distortion temperatures may be secured. Also the availability of polystyrene-base materials in foamed resins and in the form of matted highly oriented fibers for low-pressure bag molding add further industrial uses. Before the advent of such fiber mats, thermoplastics were not readily bag-molded.

Vinyls.—This group of compounds was widely used in the war in a multiplicity of services which pointed to today's extensive development in civilian and industrial products. They include the vinyl chloride-acetates (rigid and nonrigid), polyvinyl-butyral, polyvinyl-chloride, and vinylidene-chloride polymers. Their production in 1944 showed a 440 per cent increase over 1941, which was essentially in vinyl chloride-acetate polymer. This was largely used in flexible film material and in Navy cable insulation.

The large use of vinyl polymers during the war for coating textile raincoats, etc., has led to recent new products in which the vinyl chloride-acetate resins are of the suspension or dispersion type which do not require the use of active solvents in the thinner. One class is offered as flexible textile coatings, another as a dispersion type for protective coatings and for molding. Another type of vinylidene chloride as a latex has been described recently.

Organo-Silicon Polymers.— A recent development in a novel type combination of inorganic-organic polymer is finding many new fields of usefulness. The silicon atoms carry one or more hydrocarbon groups joined to the silicon through carbon atoms. Typified by unusual heat-resistance and excellent electrical insulation properties, silicones are being utilized to reduce the size and weight of electrical equipment; for example, electric motors. Their liquid varieties have been found to show little change in viscosity over large temperature variations. In spite of the fact that before the war these resins were only laboratory curiosities, their unique properties are today receiving close attention for many engineering and technical applications.

Melamine.—Formaldehyde resins prepared from this trimer of cyanamide supplied an important war function in arc-resistant molding materials and in special laminated products. It has extended its use in paper treatment for wet strength, in textile treatment, and in hot-setting plywood glues. Its properties and its expanding uses place it in the field of recent significant developments.

Allyl Resins.—First introduced in 1942, esters such as maleates, phthalates, etc., derived from allyl alcohol or allyl chloride have had some use in contact-pressure laminates. They represent a class of thermohardening materials cured by additional polymerization, a combination of properties somewhat between thermosetting and thermoplastic materials. Because of their interesting properties in laminates and castings, their further development is indicated.

Celluloid-Base Plastics.—Cellulose acetate and acetobutyrate both as molding materials and films played important parts in the war effort. They are rated as strategic plastics but are playing an even greater role in civilian usage. A new development recently announced is cellulose propionate. In addition to improving cellulosic molding materials, especially in impact, moisture sensitivity, and flow characteristics, it is expected to have advantages over cellulose-acetate film and sheet.

NEW TECHNIQUES

The use of new resins, coupled with recently developed engineering techniques, has been responsible for greatly expanding the field of plastics. Among these trends which will represent significant changes in raw materials and markets, the following may be emphasized:—

Post-Forming of Laminates.—Forming of shaped and drawn parts from laminated stock in relatively inexpensive molds.

Cellular-Core Laminates. — Sandwich construction, consisting of laminated sheets, plywood, or thin metal, separated by hollow core material such as foamed or "expanded" resin, or "honeycomb" laminated, is making significant advancement in the fields where light weight and strength are required. Notable among these fields are luggage, building partitions and walls, especially for prefabricated buildings, and self-supporting floors for aircraft, boats and automobiles. Their high insulation value points to their growing demand in refrigerator fields.

Cold-Setting Resin Glues.—These new resins of the phenol-resorcinol type have greatly increased the usability of plywood construction. Also closely connected with the increase in weather and moisture resistant wood is the notable improvement in laminated surfaced plywood.

Heatronic Molding.—A significant advance in the use of thermosetting moldings, such as phenolics and ureas, has been the application of electrostatic high-frequency heating. This technique makes possible the molding of much thicker and heavier molded parts, free from the non-uniform qualities of the earlier attempts, and at a great saving in time. Because of this the industry expects substantial extension of thermosetting materials to larger volume uses.

MATERIAL SUPPLIES

With the application of plastic materials to many new fields of use, coupled with the tremendous backlog of requirements built up during the war years, has come concern regarding the available supplies of raw materials. Today the demand for molding materials far exceeds the available supply. This situation is exemplified particularly in such materials as poylstyrene, the vinyls, and the phenolics.

Instead of a falling off in demand for plastics with the war's end has come an all-time high in requirements. For molding materials alone this industry reported 100,000,000 pounds' annual business just before the war. The production rate in January, 1946, showed the remarkable increase to 300,000,000 pounds. Some experts look to a 500,000,000-pound output in molding and extrusion compounds alone for 1947. When to these figures we add the tremendous increases in other branches of plastics, including sheet and film materials, adhesives, insulation, etc., we arrive at an industry geared to produce by the end of this year well over 1,000,000,000 pounds. This volume is reflected in turn in a wide range of the products of the chemical industry. First among these are the basic raw materials such as styrene, phenols, ureas, melamine, cellulosic compounds, vinyls, acrylates, formaldehyde, hexamethylenetetramine, various dibasic acids, etc. In addition are the requirements for a wide range of auxiliary materials, the pigments, dyes, solvents, lubricants, catalysts, stabilizers, etc. The growth of plastics is an important factor in estimating significant changes in raw materials and markets for the chemical industry.

DYESTUFFS

by S. S. ROSSANDER,
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THE TEXTILE color industry started in this country about 1917, following earlier initiation in Europe. It has expanded to include a very large number of different types of manufactured dyestuffs, involving a domestic business with an annual sales volume of well over one hundred million dollars. Aggressive research in the field has aided the industrial development by the discovery of a large variety of novel colors with superior properties as well as numerous process improvements (chemical and engineering) on known colors and intermediates.

Despite the fact that research effort on colors decreased an appreciable extent during the recent war, there was a relatively large number of patents and publications on the subject which appeared during approximately the past two years. Since this review article covers only published data,* attention is called to the fact that research work is usually completed about a year or so prior to publication. It is believed, however, that the general trend of invention and thought in dyestuff research is presented. Due to the scope of the field and especially the large number of diversified patents involved, references generally are omitted.

FUNDAMENTAL INFORMATION ON COLORS

There is no formula or theory known to date which enables one to predict accurately the absorption spectra of any new type of dyestuff. Research workers in a few fields have developed a formula for selected type dyes and this has been further extended during the past two years. G. N. Lewis[1] arrived at an empirical formula for predicting the absorption spectra of symmetrical polyphenylmethane, xanthene, acridine, diphenylamine, oxazine, thiazine and azine colors. He conceived the wave length of the main light absorption band of these dyestuffs to be a function of the fraction of the characteristic positive charge which is on the auxochromes. A. H. Corwin and Brunings[2] in a study of substituted dipyrrylmethenes concluded that there is a correlation between the color of the pigments and the ability of their pyrrole nitrogens to stabilize the positive charge of the cation in the molecule by resonance.

Articles by Standing[3] and co-workers presented additional information concerning the absorption of direct dyestuffs on cellulose, giving data on bond strength which further substantiated the hydrogen bonding theory of the attachment of direct dyestuffs to cellulose.

R. H. Peters[4] found the absorption and desorption of acid dyes by Nylon and acetylated Nylon to depend upon the pH and salt content of the dyebath in a manner which indicated that the dye is (1) attached to the residual amino groups in the fiber at low dye concentrations; (2) adsorbed on the amide groups at higher concentrations of dyestuffs and hydrogen ions.

ANTHRAQUINONE COLORS

New anthraquinone vat colors varied in shade from yellow to blue, with a noted absence of greens. Improved light and washing fastness appeared to be the primary goal, with a maximum of brilliance and bleach fastness. The condensation of thianthrenedicarboxylic acids with aminoanthraquinones gave new yellows. 1,4-Dibenzamidoanthraquinones in which one or both of the benzoyl radicals contained an alkylsulfonyl or phenylalkyl (or alkylene)-sulfonyl group were red to scarlet shades. Condensation of 5-aminoanthraquinonylthiaxanthones with benzamidochloroanthraquinones produced red-oranges, and the condensation of 5-amino-2:1(N)-anthraquinone benzacridone with 1-benzamido-4-chloroanthraquinone gave a brown. Ring closure of 1:1′-4′:1″-4:1″′-5 (or 8)-1″″-pentaanthrimide gave an olive drab. The condensation of either anthrapyridone-phenlyamino-carboxylic acids or 1-benzamido-anthraquinone-4-(phenylamino-carboxylic acids) with primary amino-anthraquinones produced a variety of shades.

Wool colors were mostly blues, with a few browns and grays, with a greater portion of the effort directed toward improvement in level dyeing, light and wash fastness properties. The base structures were old—mostly 1,4-diamino disubstituted anthraquinones. New products included the sulfonation of anthraquinone dyes containing as 1,4 substituents radicals including trifluoromethylphenylamino-, cyanomethylphenylamino-, sulfuric esters of hydroxyalkylamino-, and 6-methyl-2-benzylcyclohexylamino-. Halogenation of a sulfonated 1,3-bis(dialkylamino)anthraquinone in either the 6 or 7 position gave a red blue with increased resistance to shade change in artificial light. The following type reactions produced new grays and browns:

1) Carbazolation of selected acylamino (or arylamino)-1,1(or 1,2)-dianthrimides and diarylamino-trianthrimides, followed by sulfonation.

2) Sulfonation of carbazolated aroylamino-naphthylamino-anthraquinones.

3) Sulfonation of 4-p-benzene-azo-anilino-anthraquinone with at least one of the 1, 5 or 8 positions substituted by an acylamino group.

Emphasis in anthraquinone dyes for cellulose acetate was toward finding blues and violets which produce dyeings that do not change on storage (due to the presence of nitrogen oxide fumes). They were, generally, derivatives of 1,4-diaminoanthraquinone, which were mostly water-insoluble colors, with a few water-soluble products [sulfato esters of 1,4-bis(hydroxyalkylamino)anthraquinone]. Insoluble dyes included anthraquinone with the following combination of 1,4 substituents: (1) alkyl(or hydroxyalkyl)amino and $-NH-(CH_2-CH_2O)_n-CH_2-R$ (where R is a phenyl or α-furfuryl radical); (2) hydroxy and alkyl ether substituted phenylamino; (3) esters of hydroxyalkylamino and aminodialkyl sulfoxide or sulfones; (4) ω-cyanoalkylamino; and (5) hydroxymethylphenylamino groupings. Additional types were: (1) 1,4-diamino-2-nitroanthraquinone derivatives which may carry in 5, 6, 7 or 8 position nitro, hydroxy, alkoxy or halogen; (2) 1,4-dialkyl(or hydroxyalkyl)aminoanthraquinones containing halogen in the 6 or 7 position; (3) glycol ester of 1,4-disubstituted anthraquinone-2-carboxylic acid; (4) derivatives of 5,8-diamino-1,9-isothiazolanthrone; (5) 1,5-dihydroxy-4-arylaminoanthraquinone and (6) 1,5-dihydroxy-4,8-dihydroxaminoanthraquinone.

Quite a few patents covering improved processes for making known anthraquinone color intermediates, generally, gave a combination of increased yield and higher purity of product. The latter should, in turn, produce better quality final dyestuffs. New intermediates which should probably be useful for making anthraquinone colors are (1) β-trifluoromethyl-anthraquinone derivatives, made from the corresponding trichloromethyl compound by treatment with hydrogen fluoride; (2) stable leuco-1-amino-4-acylaminoanthraquinone, made by acylating leuco-1,4-diaminoanthraquinone in an inert solvent with an acid binding agent at a temperature such that no oxidation occurs.

AZO COLORS

New direct dyeing azo colors for cotton and rayon were mainly tris- and tetrakisazo products of two types: (1) premetallized dyes which contained coordinated copper, giving excellent light fastness (2) colors which contained groupings such that they can be metallized (usually by copper salts) during their application to give a combination of superior light and wash fastness properties. No novel groupings for metal coordination appeared, and practically all intermediates used were either known compounds or substituted derivatives of known compounds.

New cellulose acetate dyes covered a wide shade range. They were mostly

* Since only a limited amount of detailed information is available from government sources relative to German developments in the field, they are not reviewed in this paper.

monoazo colors of the water-insoluble dispersed type. These products were, in general, characterized by the use of novel heterocyclic coupling components, such as tetrahydroquinazolines, hydroxy-N-aryl-piperidines, β-keto-alkyl-tetramethylene sulfoxides and sulfones, lilolidines and hydroxy-naphtho-piperidines. There is, in general, a need for new dyes for this fiber which show appreciable superiority to marketed types in light fastness.

Wool color research was largely toward products with a combination of good light and wash fastness properties. Discovered types were either premetallized colors (coordinated form of chromium in the molecule) or dyes which could be applied in the presence of a metal salt (usually chromium salt) to produce a metallized form of the color on the fiber. Most of these products were monoazo colors, with a notable absence of a novel group capable of forming a coordinated metal complex. Some new direct colors for wool which showed unusual fastness toward washing and perspiration contained ω-halo-acyl-phenylenediamines as diazo components.

AZOIC COLORS

Research in azoic bases and Naphthols (coupling components) gave new products with a combination of brilliance of shade and fastness to light and washing. New azoic bases included *p*-amino-phenylamino-benzodioxans, 4-amino-4'-furfuryloxy-diphenylamine, as well as aminoaroylguanyl-ureas and related compounds. New coupling components were hydroxybenzocarbazole and 2-hydroxy-3-naphthoyl derivatives of 2-amino-benzothiazoles. Stabilizing agents disclosed for new triazenes were substituted urea and guanidine derivatives.

A novel method of obtaining azoic printing pastes containing an active diazo body was disclosed, which gave marked improvement in stability toward storage. This was accomplished by adding relatively small amounts of unsaturated acids, esters of unsaturated acids, or unsaturated nitrogenous water-soluble bases to printing pastes.

A modification of standard printing techniques, involving the use of a triazene base and coupling component, was disclosed in which a water-in-oil emulsion was formed, the water phase containing the coupling component and the oil phase the water-insoluble triazene. Colored prints with improved sharpness of design were claimed.

PHTHALOCYANINE COLORS

An improved process for making the blue pigment copper phthalocyanine from phthalonitrile in the presence of a coppering agent involved the use of an alkyl glycol (particularly ethylene glycol) which lowered the initial condensation temperature, and the heat evolved in the reaction was buffered by distillation of most of the solvent. A new method was disclosed for making green polychlorophthalocyanine, where sulfur dichloride was used as a combined solvent and chlorinating agent for copper phthalocyanine.

Finishing methods for giving an improved physical form of copper phthalocyanine with soft texture and good strength and brilliance included (1) controlled acid pasting and finishing under specified conditions of temperature and dilution, (2) drowning of sulfuric acid solutions of copper phthalocyanine in the presence of a water-insoluble type neutral organic liquids, such as toluene, (3) sulfuric acid pasting in the presence of mixed xylenes under such conditions that at least a portion of the latter is sulfonated, (4) dry ball milling of either copper phthalocyanine or polychloro-phthalocyanine with inorganic salts, such as calcium chloride, sodium chloride, sodium sulfate, etc., either in the presence or absence of small amounts of anionic active dispersing agents, or esters of fatty acids. (This method appeared applicable to organic pigments of other types, such as thioindigoid colors and anthraquinone vats.)

SULFUR AND THIOINDIGOID COLORS

An aluminum chloride-sulfur dichloride complex was revealed as a thionating agent to produce a wide shade range of new vattable sulfur dyes from (1) pigment forms of vat colors, azo colors, indigoid colors, etc., (2) intermediates, such as *m*-toluenediamine, acenaphthene, aromatic nitro hydrocarbons, etc. Polyamino copper phthalocyanines were diazotized and converted to corresponding thiocyano derivatives through the Sandmeyer reaction to give green sulfur dyes with good light fastness. Sodium sulfide thionation of the leuco indophenols derived from 1-naphthylamine-6-(or 7)-sulfonamide also gave green sulfur dyes with good exhaustion properties. Highly concentrated solutions of standard type sulfur dyes in polyethylene amines were reported to be especially useful for printing of textiles. Novelty in thioindigoid colors was confined to unsymmetrical types of standard molecules, with a goal of combined fastness to light and brilliance of shade.

BASIC COLORS

Triphenylmethane dyestuffs containing aromatic nuclei with *o*-hydroxycarboxylic substituents made the colors chromable after application, and produced improvement in light fastness. Sulfonation of colors containing the dioxazine grouping and substituents such as quinoxalylamino, benzoxazolylamino, benzothiazolylamino and benzimidazolylamino gave basic dyes showing a high order of light fastness and good cotton-wool union dyeing characteristics. Process improvements for making triphenylmethane dyes involved the use of selected solvents (chlorinated ethanes or *o*-dichlorobenzene) for the condensation of substituted benzophenones and substituted aromatic amines.

The condensation of products such as *p*-dialkylaminobenzaldehyde with β-cyanoacetic esters gave new methine dyes which showed good affinity for cellulose acetate and polyamide fibers.

PIGMENT DYEING AND PRINTING

New oil-in-water and water-in-oil type emulsions were listed for use in pigment printing and dyeing. Each of these emulsions contained as basic constituents a bonding agent, plasticizer, pigment, solvent, and water. In general, disclosed improvements in compositions of this class were of two types: (1) the addition of a small portion of elastomer-type polymerizing agents to previously disclosed urea-formaldehyde or melamine-type bonding agents, (2) the substitution in whole or in part of new plasticizers with alkyd-type resins. The trend of this research was toward obtaining formulations that produce colored fabric with improved fastness to rubbing (especially in medium to heavy shades), better clarity of shade and sharpness of print, and a softer and more appealing feel to the hand.

NEW TEXTILE COLORS

There was less than the usual number of new textile colors offered to the trade during approximately the past two years, with a noted absence of any new group or class of textile colors that required a novel type of application procedure. It was rather difficult to judge accurately the meritorious properties of the dyes announced (some were duplications of existing standards under new trade names). It appeared probable, however, that most of the textile colors released were either duplications of existing colors on the market, or new dyes which showed no, or relatively slight, advantage over existing standard products in one or more properties, such as brightness of shade, dischargeability, wash fastness, light fastness, etc., for selected fabrics.

Varying degrees of improvement were noted in the quality of many of the commercial standards of textile dyes and pigments. This improvement has been mostly along one or more of the following lines: (1) higher chemical purity (2) better physical form for application, requiring less control by the dyer in order to produce either standard equivalent or superior quality dyed fabrics (3) improved physical condition for easier handling, especially toward obtaining dyestuff and pigment powders that show a minimum of dusting.

IN SUMMARY

To summarize, textile research during the war slackened materially, as attention was shifted to the production of blues, olives, and khakis for the armed

(*Turn to page 397*)

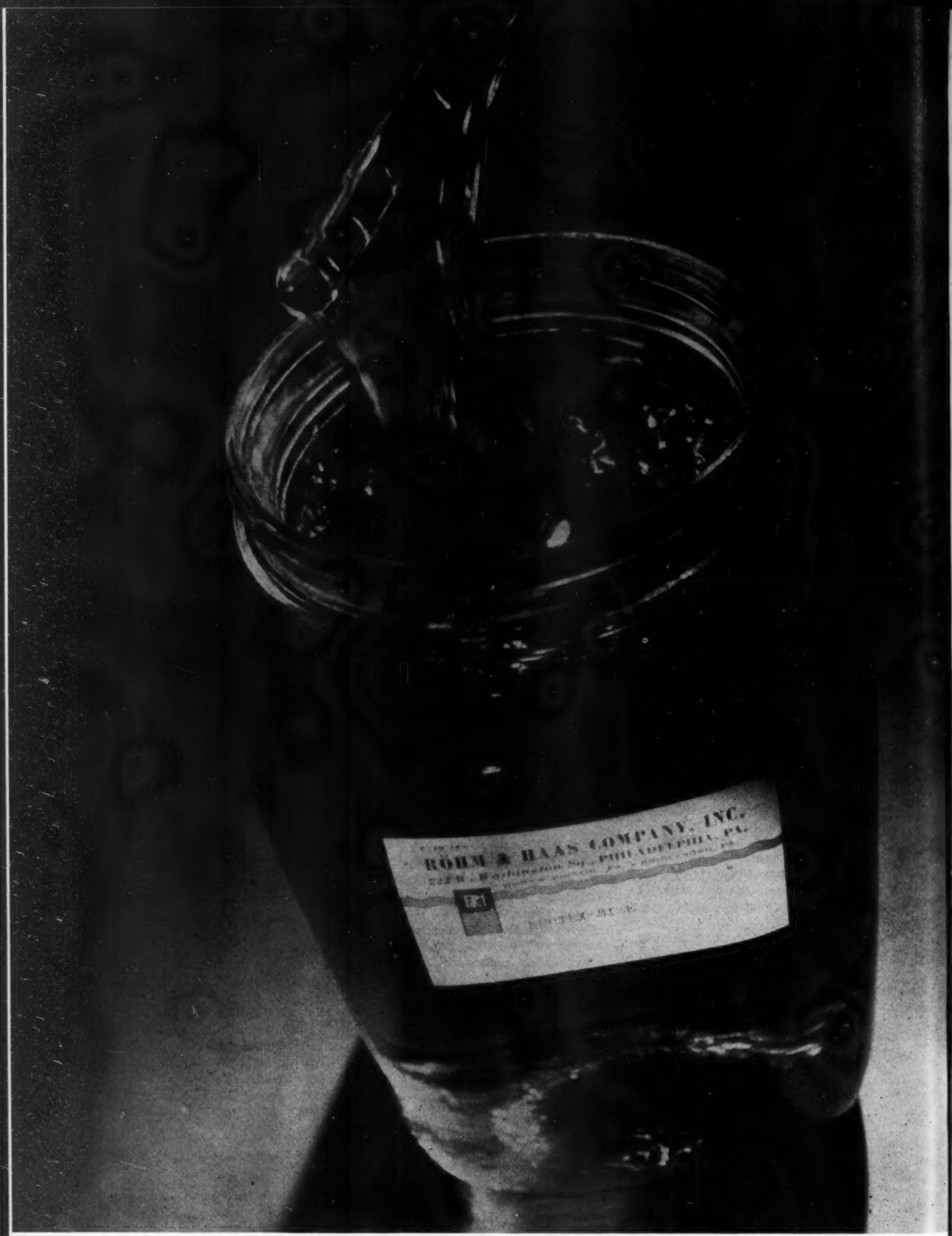


Illustration courtesy Rohm & Haas Co. Inc.

Running the gamut from two ounce bottles to fifty gallon drums, chemical specialties now account for $1.5 billion annual gross sales.

Chemical Specialties Open New Markets

WHEN the U. S. chemical industry was founded the nation's chemical needs were few and simple. Sulfuric acid, caustic soda, and such heavy chemicals were the basic products necessary to the functioning of the then small manufacturing nation.

But, as the years passed, and industrialization proceeded apace, chemical needs changed. They became more complex—more diverse. Heavy chemicals, of course, held their fundamental position, but with each industrial advance new needs arose; needs for different chemicals—to perform a particular function, either better or cheaper.

So it is that the chemical specialty division of our industry came into being—an industry which currently accounts for a $1.5 billion annual sales volume. For, in specialized mass production, special chemicals and chemical compoundings, are required.

Consideration of the growth of but one typically American industry will serve to bring such facts into focus. As automobile production soared, the demand for quick-drying lacquers boomed, and a corresponding need for unique lacquer components arose. Likewise, rubber output burgeoned, and with it the demand for special plasticizers, accelerators, and antioxidants. Increased automobile production, in turn, resulted in the growth of the petroleum industry—and the creation of a market for extreme pressure additives, pour point depressants, and so on. In each case, the call was for a heavier tonnage of processing chemicals, and different chemicals and compounds to serve a *specific* purpose.

Thereby, one division of the chemical specialty business was born, as a distinct part of the chemical industry proper. A segment which paid sharp heed to the requirements of general industry; developed new products with an eye to economics; appraised growing markets and capitalized on the growing complexity and diversity of manufacturing operations, and produced specialty compounds precisely suited to industry's needs.

Two functions were apparent. Pure chemicals were manufactured, and sold as made, but under a trade name. In other cases, several chemicals were compounded, to perform a specific industrial task. Formulations were generally not revealed, except in the broadest terms.

Apart from this segment of the chemical industry, another manufacturing group arose. These concerns bought chemicals from basic producers, compounded them, and sold their specialty product to industry. The main asset they possessed was an intimate knowledge of processing techniques in a particular industry. Their work was largely of a pioneering nature. They have done much to broaden chemical markets. Therein, today, we find companies specializing in the problems of the textile, pulp and paper, insecticide, metal fabricating, and other industries.

Too, as the homestead days passed, individuals became less self-sufficient. No longer was it possible or feasible to make one's own soap, paint, and tallow. With the attainment of a higher standard of living, the public needed, and had to buy, more specialty products—cleaners, polishes, insecticides, and the myriad aids to modern living. Originally, such compounds were manufactured by companies separate from the chemical industry and chemical manufacturers paid but little attention to the household market. This, to quite some degree, is still the case, but the trend is definitely in the other direction. One major chemical concern entered the consumer specialty market some years ago. Since then many others have followed. In the past few months alone, three large chemical houses have entered the field aggressively, packaging, or compounding their products for retail sale. Many others, in consideration of profit potentialities, have laid similar plans.

Precise definition of what is and what is not a chemical specialty is difficult. The line of demarcation between chemicals and specialties is not sharp and clear. The relationship is so close that some overlapping is inevitable. However, rather arbitrarily we have classified specialties as "any standard chemical product which has been elaborated on in any way before sale." Thus we would regard DDT as a chemical; DDT plus solvent or talc—or even in pure form if packaged, and sold under an end-use tradename—as a specialty. There are many borderline cases. Our classification is admittedly not too definitive; refinements will be effected as circumstances dictate.

However, CHEMICAL INDUSTRIES, alert to the growing importance of the chemical specialty business, has undertaken the task of providing its readers with an outline of recent trends and developments in this field. On the following pages are articles written by 14 authorities, and a listing of more than 160 new specialties produced during the past two years.

We feel that therein is much information of significance and substantial value.

HOUSEHOLD DISINFECTANTS

by E. G. KLARMANN,
Research Vice-president,
Lehn & Fink Products Corp.

BEFORE the war, most household disinfectants could be grouped in one of the following three categories: coal tar, cresylic and pine oil. During the war, the new class of quaternary ammonium or cationic disinfectants gained considerable prominence.

In addition, numerous synthetic phenol derivatives became available whose formulation into disinfectants was promoted particularly by the shortage of coal tar acids.

The above three groups of disinfectants still constitute the bulk of household products. However, the use of synthetic phenolic derivatives as active germicidal ingredients appears to be on the increase, such chemicals being used either alone or as fortifying agents for some of the disinfectants belonging originally to one of the three groups listed.

The phenyl phenol derivatives are the most important chemicals of the type under discussion. They came into extensive use during the war owing to their comparative availability during the time of severe shortages of practically all other disinfectant raw materials, and notably of cresylic acid. Although cresylic acid may become more freely available again, enough experience has been gained with the synthetic phenolic materials to warrant the belief that their use in disinfectant formulation will continue.

As to the general market situation on coal tar disinfectants there existed a stringent shortage of tar acids at the beginning of the year for which several factors may be made responsible. Thus the demand for a maximum output of coke for steel production necessitated the operation of the coking ovens at higher temperatures, thereby affecting the composition of the tar, in that the proportion of tar acids present was lowered while its naphthalene content was increased. The more serious decline in the output of tar acids followed upon the crippling steel and coal strikes.

Fortunately, the outlook is improving at this time; barring any unforeseen difficulties, a near-normal situation should be in evidence within the next two months or so. Although a sizable quantity of tar acids of definite fractions is absorbed in the production of synthetic resins and plastics this should not affect the total distribution picture; accordingly, the disinfectant industry should continue to obtain its due share of tar acids.

The pine oil situation continues to be somewhat stringent, and, although considerable quantities of pine oil disinfectants are produced, the demand exceeds the supply by a small margin. The reason for the shortage is to be found in the lack of equipment which as yet has not been built up to the required degree. Besides, very appreciable quantities of pine oil are being deflected to the textile industry, which uses this oil in different formulations, e. g., for the scouring of fabrics. Too, some pine oil is taken by mining interests and used for ore flotation.

However, with more equipment becoming available the pine oil production should catch up with the demand in the near future.

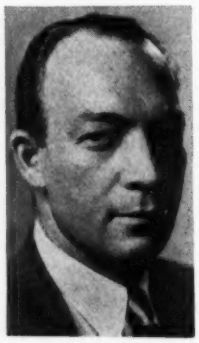
Although there exists a shortage of coconut oil at this time, there seems to be an ample supply of quaternary ammonium compounds. The lauryl (dodecyl) radical of several quaternary ammonium compounds is derived from coconut oil, but the producers of at least one lauryl derivative (employed in the condensation reaction which leads to the formation of the quaternary ammonium compounds) appears to have enough material available from which to synthesize this derivative.

While quaternary ammonium compounds appear to perform satisfactorily as sanitizing agents, e. g., in the treatment of glassware, food handling equipment, etc., some question has been raised recently concerning their equivalence with other disinfectants, if the F.D.A. testing method is used as the means of comparison.

POLISHES

by L. C. CARTWRIGHT,
Research Director,
Foster D. Snell, Inc.

PASTE, liquid solvent, and water-dispersion waxes remain substantially the sole types of floor polishes sold at retail in significant volume, but various research laboratories are working on the development of entirely new and improved types. Short supply and high cost of carnauba wax have resulted in its extension, and even replacement, in all three types of floor waxes, with cheaper and more available waxes. At the same time, the proportion of resins used in these products has tended to increase. Unfortunately, in many instances, although not invariably, this trend has resulted in lowered performance quality, especially in the case of self polishing water-dispersion waxes.



Paste wax appears to be losing out in the floor polish field in competition with liquid solvent and water-dispersion types. Although water-dispersion floor waxes have led in sales by an increasing margin for a number of years, some producers of liquid solvent waxes, through improvments in performance characteristics of this older type of polish, appear to be increasing their share of the market.

In spite of the still existing shortages and high cost of raw materials, the future outlook for floor polishes is bright. The development of improved formulations, perhaps based on new synthetic resins and waxes carefully blended with natural products, the accelerated housing program, and increasing consumer awareness of the advantages of proper floor maintenance, should result in a greatly expanded market for these products.

FURNITURE POLISHES

Among the numerous types of furniture polish sold at retail, including clear oil, unstable oil emulsion, acid oil emulsion, cream oil emulsion, and paste and liquid solvent waxes, the trend of consumer preference appears to be toward cream oil emulsion. However, unstable oil emulsion retains its popularity with many users, and there is some evidence of renewed interest in the acid oil emulsion type containing antimony. There are also indications of increased demand for improved liquid solvent wax polish for furniture.

Shortages have forced the replacement of sulfonated castor oil with other sulfonated oils, and these with other emulsifiers, such as some of the new non-ionic surface active agents, in cream oil emulsion furniture polishes. Some of these altered formulations may well be retained as superior even when the shortages which forced their development no longer exist.

The market for furniture polish is also an expanding one, and the future outlook is good, especially for those manufacturers who give constant attention to the performance of their products.

METAL POLISH

Abrasive metal polishes, powder, paste, and liquid, solvent-base and water-dispersion, are still in good demand, although their production was curtailed by war shortages, especially of oxalic acid, ammonia and amines. However, newly developed non-abrasive or very mildly abrasive metal polishes, depending wholly or mainly on chemical action to remove soil and corrosion, are arousing much interest and may displace, to a considerable extent, the older abrasive types. Some of these new polishes contain a thickening agent to aid retention on large surface areas, acid to remove corrosion, an inhibitor

to prevent injury to the metal surface, a surface active agent to aid in wetting and remove soil, and a moderate amount of mild abrasive to polish the surface with a minimum of rubbing. The future outlook, especially for quality products, is excellent.

In the automotive field the return of stored cars to use and expected full production of new cars should result in rapid expansion of the automobile polish business, which was drastically curtailed by shortages of both automobiles and raw materials. No important trends or changes in types of formulations in this field have been noted. For a thorough job, an abrasive pre-wax cleaner, followed by polishing with a high quality paste wax, is still preferred. New cars, or cars with the finish in good condition and only moderately soiled, may only require washing and waxing. For single treatment polishing, water-dispersion of abrasive and wax, or combinations of light blown castor oil and mineral oil with abrasive, are in considerable demand.

HOUSEHOLD CLEANERS

by DOROTHY NEIDIG,
Boyle-Midway Inc.

THE eagerness of American homemakers to try new things has promoted a retail market for cleaning compounds which is fast becoming flooded with novel products. Among the more useful of these new products are those utilizing synthetic detergents. These surface-active compounds have found greatest application in rug and upholstery shampoos, wool, rayon, and silk washes, dish washing compounds, glass cleaners, liquid floor cleaners, and spotting soaps in dry cleaners.

Generally speaking, they are most useful in applications in hard water areas where their neutral, mild properties make them desirable. The most striking characteristic of solutions of these detergents is the reduction of surface tension of gas-liquid systems or of interfacial tension of liquid-liquid systems. These chemicals all contain a hydrophobic and a hydrophilic group, preferably at opposite ends of the molecule.

The applications of such detergents lie in the fact that many combine good properties of wetting, emulsification, detergency, and dispersion and, in general, perform well in cool, acid, or hard water. In this specific respect they excel soap.

In recent months many new products have been put on the market for cleaning rugs and upholstery at home. These cleaners are usually solutions of synthetic detergents in concentrations of less than 25%, which are diluted further before application. In solutions of this concentration the shampoos have a viscosity of about that of glycerine and some become even more viscous on further dilution. Many rug shampoos include small amounts of alkali in their formulations. Several producers have incorporated one per cent of ammonium silicofluoride or sodium-aluminum silicofluoride in the formula and then claim these shampoos to give protection against moths. The dilution for upholstery shampoos is usually half that recommended for rugs. The new shampoos have the advantages that they form mild, stable, dry foam. It is this foam which is applied to the rug or upholstery.

One rug company has patented a dry mixture of bentonite, wood flour, and Stoddard Solvent which is worked into the rug and removed with the vacuum cleaner.

Another progressive manufacturer is planning to market a prevulcanized Buna latex which is applied to the backs of rugs to make them skid-proof. The backing is applied with a brush and will not harm the rug or stick to the floor. The rubber film has been subjected to severe Fadeometer, oxygen bomb, and oven tests without decomposing, becoming tacky, or yellowing.

Even in window and glass cleaners detergents are making their mark. In concentrations of a tenth of one per cent or less they make polishing the glass much easier, emulsify grease quickly, and hold in solution the oils added for odor. Also many new alcohols such as 2-methyl-2,4-pentanediol and the monoethyl ethers of ethylene glycol and diethylene glycol are finding application in glass cleaners. These alcohols have excellent solvency for greases.

FLOOR CLEANERS

In floor cleaning compounds the trend is toward the use of powdered cleaners. These cleaners often contain a powdered synthetic detergent. Most usually, however, they are simply physical mixtures of trisodium phosphate, soda ash, sodium sesquicarbonate, ammonium chloride, and sodium bicarbonate. They range in pH from 9 to over 11. One patent deals with a mixture of trisodium phosphate, soda ash and bone glue. Present advertising trends can be seen by advantages claimed in this patent of a protective coating of glue formed on drying. The glue is said to function as a protective film which prevents dust from collecting, to prevent too harsh action on the part of the alkali, and to act as a detergent.

Manufacturers of these powdered cleaning compounds have had problems of caking, increasing bulk, heterogeneous products, and water absorption; however, now they are putting on the market homogenous materials which are packaged in light weight boxes with handy pouring spouts instead of heavy jars. Paste cleaners composed of trisodium phosphate, a detergent, pine oil, and water have also been popular in recent months. Gaining in popularity for floor cleaners are solutions of synthetic detergents being sold by several petroleum companies.

SPOT REMOVERS

Spot removers and dry cleaning compounds for home use are being marketed with success. One oil company has been selling a naphtha cut and doubtless other companies will market similar compounds when large size cans again become available. Noninflammable mixtures of carbon tetrachloride and benzene or plain carbon tetrachloride have been marketed for many years. A new compound which combines the function of dry cleaning (removal of organic soluble stains) with that of spotting (removal of water soluble stains) in a single operation is soon to be marketed. A patented stain removing composition uses two sticks; one a solid polyethylene glycol, triethanolamine, and oxalic acid mixture; the second, polyethylene glycol and sodium bisulfate. These sticks are excellent for the decolorization of iron-tannin inks by reducing the colored ferric compounds to the colorless ferrous derivative. The ferrous compounds are also more soluble. Thus rust spots and stains of ferric-tannin inks can be removed. Enzymatic type stain removers are also under consideration. In this field the trend is to handy applicators, sticks, and gadgets which may be carried in the pocket. The triethanolamine salts of fatty acids are often utilized in these spotting soaps since they are excellent emulsifiers and are miscible with organic solvents.

LAUNDERING COMPOUNDS

The greatest quantity of synthetic detergents consumed in the home will be used for dish washing and in fine laundering. They are fast becoming accepted as compounds which leave dishes sparkling without being wiped. The alkyl aryl sodium sulfonates, whose long chain alkyl group is derived from petroleum, have now approached soap in cost and thus, while homemakers are willing to pay more for specialty compounds, the fact that these detergents are no more expensive than soap will increase their popularity. An added feature in their favor is that dish cloths never have the "rancid" odor that they often have when soap is used.

The tasteless synthetic detergents are also good for washing insect fragments and dirt from air pockets of vegetables such as broccoli and cauliflower. This is

important to homemakers but is even more important to commercial canners.

While soap leaves cotton much cleaner, the surface-active agents are becoming increasingly useful as detergents for fine laundering. They can be used in cool water which means no shrinkage of woolens. Clinical tests conducted in Buffalo on more than 200 patients with skins allergic to soaps showed they could use these detergents for washing with no irritation. These synthetics are available as amber liquids, cream colored pastes, powders, flakes, chips, and beads. As soon as they become more readily available, the retail market will see more and more of their use in dish washing compounds, fine fabric washes, rug and upholstery shampoos, and other such household cleaners.

AIR DEODORANTS

by E. C. CROCKER,
Arthur D. Little, Inc.

A SMALL quantity of a pleasant scent diffused into the air may serve to overcome an objectionable odor. An analogy from the sense of taste is the

sweetening of tea or coffee, to cover the bitterness, and an analogy from the sense of sight is the blueing of yellowish linens or cottons to make them appear white. In each instance, there is addition to an already existing situation, but the effect is such that it may properly be called "neutralization". Thus by "deodorization" is usually meant not the removal of odor but its change to a more acceptable or less noticeable character. The use of deodorants is widespread, and their effectiveness good, but it would seem that there is still room for more and better deodorants, possibly some with the aerosol bomb type of propulsion, and others with weak continuous activity.

An old form, still important, is the so-called "theatre spray", used to freshen the air of theatres, Pullman cars and other places where people congregate closely. Most of these sprays are of dilute ethyl or isopropyl alcohol, containing 1 or 2 ounces of perfume oils per gallon, but there are also all-water types in which the oils are emulsified. Some very refreshing floral and outdoor odors are available. There has been a trend recently toward spraying these onto the dust filters of the air-conditioning systems, which insures distribution and creates a satisfactory effect.

A widely advertised home deodorant depends for its activity on perfume being evaporated from a wick that is pulled up out of a bottle to make a vaporizer. This is convenient, though its activity is short-lived after each raising of the wick. However, such comparative puffs of deodorancy are often all that is needed in the home, to overcome temporary or hang-over odors. A considerable part of the success of this deodorant has been in the appropriate odor used. It exhales new mown hay and piney and flowery scents. The base is water in which the perfume is emulsified, plus enough formaldehyde to serve as an anti-mold. Some people object to formaldehyde vapor which smarts their eyes and nose and dulls their sense of smell. This wick deodorant is intended to replace the perfume atomizer in the home and also the old-fashioned placing of dry coffee on the hot stove to overcome odors such as those of a boiled dinner.

There was at one time a wick-type vaporizer which worked continuously, though weakly. The wick was a flower, which imbibed an oily perfume through a long stem from a small bottle. These weak vaporizers did a very effective job of overcoming the musty odor in country homes. A larger and more effective form of this device might be of service in basements and even in offices in buildings of old construction.

INSECTICIDES

by JOSEPH B. SKAPTASON,
Technical Sales Director,
John Powell & Co., Inc.

LAST year magazines and newspapers in this country carried over 4000 different articles on the insecticidal applications of a chemical that in 1874 was

a laboratory curiosity — dichloro diphenyl trichlorethane. Some wit has remarked that this chemical — DDT—had a good publicity agent. But it was more than that. For the wide acceptance accorded DDT points up a trend which has obtained within the industry for some years past—the constant development of specific compounds for the control of certain pests.

In the not-too-distant past there were but few insecticides available, which, perforce, had to serve rather general purposes. But from the day that Paris Green was introduced, almost eighty years ago, through lead arsenate (1909) and calcium arsenate (1914) research has provided more effective, and more specific, means of controlling insects. Since the turn of the century alone some 45 specific insecticides—an average of one a year—have been developed for *commercial* use. In the same period, hundreds of compounds have been patented which have not as yet reached tonnage stature. Insect control is now a major U. S. industry.

One of the more important recent developments is the insecticide developed in England, known as 666, or hexachlorocyclohexane. During the war it served a definite need in Great Britain for the control of the turnip flea beetle. Subsequent experiments in this country, and in Canada, have demonstrated that it has a greater usefulness, and holds promise for the control of aphids and cotton insects.

At least seven organizations are conducting pilot plant studies on its production and it is quite possible that by next year it will be of considerable commercial significance. The odds are against its finding wide use in household insecticides, however, in view of its comparatively high odor level. Too, it does not appear to possess the long-lasting residual toxic effects which have made DDT so valuable.

Another recently marketed material is "1068"—derived from the empirical formula $C_{10}H_6Cl_8$. It has definite insecticidal promise, but it is rather too new to justify any dogmatic statement as to just where it will fit into the insect control field.

Too, in recent years the dinitro compounds have become well established in orchard spray practice for mite control, and other variations have been used successfully for the control of the red spider.

In this latter field, azobenzene, too, has a very interesting use in red spider control. Even though it has a relatively high melting point it has been used as a 70 per cent concentrate in Celite, which in paste form, is painted on greenhouse steam pipes. Consequent volatilization of the chemical provides a fumigating vapor. While quite promising it is impossible to say whether azobenzene will find a permanent place in the insecticidal program.

An equally novel development is the use of sodium selenate for the eradication of red spiders. The salt is added to the soil and is absorbed by the plant. Such plants are then immune to attack from this pest and certain other insects. This mode of insecticide application is unique. Years are necessary to develop plant strains resistant to selected insects, and few such cross-breeding projects have been successful. Plant immunization could open up an entirely new field for the industry. Its possibilities are not being overlooked.

The large scale commercial use of a whole new group of synthetic organic chemicals has launched us into a new era of insect control. As we mentioned before, DDT is only the forerunner. Some of these are all ready in production—the homologs, analogs and isomers of DDT, as well as 666, and 1068.

The trend is definite and apparent. From comparative rule-of-thumb methods, the industry has grown to one of sizable proportions based on sound scientific principles. Research, both chemical and entomological, is proceeding apace. More compounds, which are the precise answers to many insecticidal problems are being synthesized, and being studied. Many will emerge from the laboratory to serve as superior agents in man's eternal battle against insects.

RUBBER CHEMICALS

by HARRY L. FISHER,
Director of Organic Research,
U. S. Industrial Chemicals, Inc.

THE government synthetic rubber. GR-S, from butadiene and styrene, was produced up to about 725,000 long tons in 1945. The amount will be only slightly less this year and will probably remain around 600,000 long tons in 1947. Even when natural rubber is plentiful, if the recommendation of the Batt Interagency Committee is followed, the amount of GR-S will not be less than 250,000 long tons, which is about half of our annual pre-war consumption. The total of all synthetic rubbers was around 830,000 long tons in 1945 and will be about 775,000 long tons this year. With natural rubber coming in these figures mean a total annual consumption of about 1,000,000 long tons.

The consumption of rubber chemicals and compounding ingredients will continue to be large and will vary somewhat according to the amounts of the different rubbers used since the requirements for each type are slightly different in both kind and proportion. The carbon blacks are necessary to bring out the best physical properties of nearly all synthetic rubbers and their use will diminish as the amount of GR-S becomes less, but not necessarily in proportion because they, of course, are used in all tires.

When the production of GR-S goes down, chemicals used in its manufacture will also go down. Soap and other emulsifying agents, potassium persulfate, mercaptans and other organic sulfur modifying agents, and short-stopping agents will all be used in lesser quantities. Cheap butadiene and styrene will become available for other purposes. Butyl rubber will be increased in production probably above 75,000 long tons annually. It is of outstanding merit for inner tubes because of its high air retention.

Neoprene is lower in production than during 1941 but continues to hold its own, and the Buna-N types (butadiene and acrylonitrile) are increasing in production. These rubbers together with Koroseal and Thiokol fill needs that cannot be met by natural rubber.

GR-S latex is now about equal in consumption to pre-war natural rubber latex. It fills practically all requirements and can be produced and shipped to compare economically with natural rubber latex. The chemicals used in its preparation and manufacture will continue steady. Foam GR-S latex products as well as blown GR-S compare very favorably with those from the natural variety.

Accelerators will continue in great demand because of the large consumption of all rubbers. Mercaptobenzothiazole and its derivatives are still the most popular. Of the antioxidants phenyl-beta-naphthylamine is used in all types in greatest amount.

Softening and tackifying agents are used to a greater extent in synthetic rubbers than in natural. Refined pine tar, coal tar, petroleum, and turpentine products are economical and widely used. High molecular weight esters of dibasic acids are helpful in specialty products.

Silicon compounds are on the increase. One is a non-carbon black reinforcing compounding ingredient and the other is a silicone rubber which has remarkable resistance to heat and cold, oxidation (aging), oils and greases.

Reclaimed natural and synthetic rubbers give satisfactory results separately and in blends; new types of GR-S will be developed and tested on a larger scale; and chemical derivatives of both natural and certain types of synthetic rubbers—the hydrochloride (Pliofilm) for packaging and chlorinated rubber for paints—will increase in volume.

LEATHER CHEMICALS

by KENNETH E. BELL,
Vice-president,
A. C. Lawrence Leather Co.

THE leather industry has had the experience common to all American industry of attempting to produce peak quantities of leather in the face of acute shortages or elimination of customary materials and sources of supply. The current situation is as bad as at any time during the war. Inevitably such a situation has accelerated the trial and acceptance of new materials for permanent use.

The industry has used rapidly increasing quantities of sodium sulfhydride, although many tanners still continue to rely mainly on sodium sulfide, lime, etc. together with varying quantities of dimethylamine. The goal is to secure rapid and complete removal of hair without impairment of strength or grain appearance.

Alum and chromium salts continue to be the chief materials used in mineral tanning, although limited quantities of zirconium salts are consumed for special purposes. A trend toward sulfur dioxide reduced chrome liquors continues, which is rapidly accelerated at the moment by the acute shortage of corn sugar. The reports on the German tanning industry indicate widespread usage of organic salts such as phthalates as masking agents. Most tanners have investigated possibilities of such materials in securing more rapid or complete fixation of chrome.

The depletion and deterioration of the supply of chestnut and chestnut oak bark and wood during the war period has caused grave concern. In addition, shipping and political difficulties have seriously restricted the supplies of quebracho wood extract, wattle bark, etc. from foreign sources. The combination of these circumstances has brought into sharp focus our vulnerability on long range sources of vegetable tannins. These led to development work on completely synthetic materials. These are now available and for the first time satisfactorily tanned leather can be produced with synthetics. Some tanners are operating on a production basis with appreciable quantities of such material. Concurrently great improvements have been effected in other syntans derived from phenol and naphthalene bases and from sulfite cellulose paper mill liquors.

The adoption of the pasting process has continued during the past two years. Leather which has been tanned, colored, fat liquored, and set out, is applied to smooth sheets of enameled iron or glass and dried in this condition. The resulting leather has smoother grain and yields greater footage. This process requires careful formulation of adhesives, which not only hold the leather in place when wet but also when drying nears completion. Such paste should not be visible after the leather is stripped, and readily removable by rapid washing. More work is needed on this problem.

War use under jungle conditions shows that most materials, including leather, require improved fungicidal treatment for such service. The industry is conducting research work on this problem with the aim of securing chemical combination of fungicides with the leather molecule to ensure permanence of treatment.

While pigment-casein-shellac formulations are still widely used as finishing material, intensive development is under way in the adaptation of synthetic resins for such service. Such finishing materials, intensive development is unplication of water dispersions, since toxic

and inflammable solvents are not desirable. The finish should enhance the natural characteristics of the leather without obscuring them with an oilcloth-like film. Resulting coatings should not crack at sub-zero temperatures nor become tacky at high summer temperatures. They must stand almost unlimited flexing and the rigors of lasting and forming in shoe factories. It is difficult to combine all these characteristics in one material. Hence expert formulation is required and a profitable field awaits the successful producers.

Tanners have been reassured by the public clamor for genuine leather items. Their current worries, however, are due to acute shortages of raw hides and skins. These are not only the normal aftermath of the war but have been aggravated by black market operations and a difficult price control situation.

INDUSTRIAL ADHESIVES

by L. F. WEYAND,
Vice-president,
Minnesota Mining & Mfg. Co.

THE past few years have seen several rather significant changes affecting both the formulation and end uses of industrial adhesives. While this war-to-peace transition period has given rise to rapid fluctuations in raw material availabilities, the net result may be considered rather salutary on the whole. For the purposes of this discussion, we will consider only the so-called elastic adhesives, excluding the animal or vegetable glues.

Perhaps the greatest single impetus given adhesive development was the drastic curtailment of natural rubber, rubber derivatives and certain high grade reclaims. Research with a view to evaluating new raw materials to replace those temporarily or permanently unavailable has brought to light many new types of adhesives that might otherwise have been overlooked. Work with the various elastomers and resins has opened a whole new field of usefulness for adhesives. Examples of this growth are the satisfactory bonds adhering glass to itself and metals, metal to itself, heavily plasticized rubber or synthetic stocks to themselves, wood or metal. By proper selection of ingredients, it is now possible to produce adhesives which have exceptional resistance to many solvents and chemicals, remain stable over wide temperature ranges, and over a long service life.

The growing use of plastics and synthetic rubbers has made the possibility of an all-purpose adhesive more remote than ever before. Beyond the consideration of materials to be bonded, such factors as desired application methods and service conditions (solvents, temperatures, strength, etc.) must also be weighed. All of these variables are making it increasingly difficult to make an on-the-spot choice of an adhesive without evaluative tests and have led to the "tailoring" of products for rather specific end uses. This is the reason why industrial adhesives are seldom marketed without prior testing by either the manufacturer or consumer.

As for the adhesive compounds themselves, their physical characteristics are almost as varied as the uses to which they are put. In consistency they run all the way from water-thin solutions or suspensions which may be sprayed, brushed, dipped or roller coated on up to the heavy mastics which must be applied with a saw-toothed scraper, putty knife, or caulking gun. Some form a film by simple evaporation of a solvent, while others are of nearly 100% solids and must be cured by heat or through addition of an accelerator. Setting times may be varied from a matter of seconds to several hours.

Where fire or toxicity is a hazard, films may often be deposited from a water suspension—and still have water or solvent resistance after setting. Too, it is possible for the manufacturer to cast dry films of some adhesives and supply these rather than solutions. Bonds are accomplished by heat and pressure when such films are employed. Thus it is possible to furnish a packaged product to fit almost any production schedule or any of the standard or specialized equipment now available for most efficient usage.

Because the physical characteristics of adhesives vary so widely, we often find them adaptable to uses where their ability to adhere is secondary to their ability to protect or seal or caulk. Thus we see products which are basically adhesives being used to caulk the flight decks of aircraft carriers, to protect petroleum storage tanks against the corrosive action of crude oil, or to seal automobile bodies against drafts, dust and moisture.

It has been interesting to note the recent trend of thinking in industry as a whole—it seems that industry is becoming more "adhesive minded" than ever before. Mechanical fastenings of all kinds are being replaced by adhesive bonds wherever feasible. The reasons for this trend are several, but probably the most significant is the greatly improved performance and dependability of today's adhesives. Part of it may also be due to a better understanding of the role adhesives can play in manufacturing processes and the economy of material and labor that can be realized. The adhesive industry itself has graduated from the rule-of-thumb methods of a few years back and is now founded on a second scientific basis—equipped to handle almost any problem with efficiency and confidence.

AGRICULTURAL CHEMICALS

by P. H. GROGGINS,
Bureau of Agricultural and
Industrial Chemistry, U.S.D.A.

WHEN consideration is given to the chemicals required for crop production, crop and livestock protection, seed, soil and structure fumigation, weed eradication and the preservation and processing of foods, it is clear that agriculture is in all probability the largest market for chemicals.

During the past few years, a number of well defined trends with respect to the production and marketing of chemicals for agriculture have been noted. These are: (1) the progressively increasing use of synthetic organic chemicals, (2) the realization on the part of farmers that an appropriate investment in chemicals gives large rewards in crop production and constitutes a prudent, if not excellent, investment in crop protection, and (3) the recognition by members of the economic poisons industry that they can best serve agriculture by providing farmers with warranted crop protection using any and all useful materials instead of promoting the sale of any particular product.

Included in the newer synthetics is the highly, but justly publicized, DDT which makes possible better control over some insects than heretofore, and provides adequate control for the first time over others. The use of organic thiocyanates as insecticides has increased greatly, while the thiocarbamates are finding new and increasing applications as effective fungicides. 2,4-Dichlorophenoxyacetic acid, originally developed as a useful plant hormone, now holds great promise as an efficient herbicide.

Notwithstanding the inexorable advances of synthetics, the markets for insecticides from plant sources, as well as inorganic materials, have remained steady at high levels. This phenomenon is to be attributed to the fact that most farmers have realized the entomological and economic importance of insect control. It is doubtful that this experience—born of wartime necessity in producing the maximum quantity of food—will soon be forgotten.

The chemical industry has been quick to

implement the research of agronomists, entomologists, and plant pathologists by providing appropriate formulations of new economic poisons. In this connection, it is found that greater use of surface active agents is made so as to insure longer lasting and more efficient sprays and dusts. Moreover, those responsible to farmers for guidance note with satisfaction the inclusion in the formulation handbooks from reliable firms, of accurate and comprehensive data regarding the efficacy of their products for specific types of control.

For at least the next two crop seasons, American farmers are assured of price support for many crops. There is unmistakable evidence that this form of economic insurance, which is an incentive to the farmer to get maximum production of highest quality products, has created, and will continue to provide a large and stable market for chemicals.

It is reasonably safe to predict that chemicals for agriculture will be in great demand during the immediate future, and it is altogether likely that the demand will continue on a high level as long as the present relationship between prices for farm products and prices for needed chemicals remain at about present levels.

INDUSTRIAL CLEANERS

by DONALD PRICE,
Technical Director,
Oakite Products Inc.

THE development of industrial cleaning during the last few years has been characterized by the increased complexity of the problems encountered.

Not only has the application of the newer types of surface coatings, such as the synthetic resin enamels, demanded a higher degree of surface cleanliness but sensitive metals and new alloys have imposed more rigid requirements of safety from chemical attack. Furthermore, the time allowed for cleaning operations has been steadily cut down by the remand for increased production.

During the period under review there has been less emphasis upon the development of radically new types of cleaning materials than upon improvements in methods of application. Automatic and semi-automatic spray washing machines have been widely introduced into the metal industry. In dairy practice the trend has been toward the use of spraying equipment and away from the old recirculation and manual methods of cleaning. The railroad field has seen the widespread installation of car washing machines in which cleaning solutions are sprayed on to the surfaces of the car as it passes between vertical revolving brushes. In fact, the pressure of large volume production schedules during the wartime and postwar periods, has led to a more intelligent application of engineering principles to cleaning processes in all fields.

Certain technical developments are noteworthy, however. Increased demands for heavier corrosion resistant, electrodeposited metallic coatings have brought about improvements in the materials and methods of electrolytic cleaning. The development of plating on plastics has imposed critical requirements for the cleaning of the plastic before deposition of the immersion silver coating. The return of zinc to consumer products has brought up the problem of the cleaning of zinc die castings for the application of corrosion resistant and decorative coatings. Great progress has also been made in the preparation of aluminum for electroplating as well as the chemical preparation of aluminum alloys for organic coatings.

The spot welding of aluminum in the fabrication of airplanes was practiced on a vast scale during the war and demanded a successful method for the surface preparation of the alloys. The solution to this problem of chemically removing the oxide film in such a manner as to make large scale production welding possible constituted a significant contribution to the war effort—which is carrying over into the fabrication of peacetime aluminum articles.

The past two years have seen a wider use of synthetic surface active agents in the formulation of industrial cleaning materials. In fact, it is often impossible to compound a cleaner possessing the speed and efficiency required to meet present day conditions without the enhanced activity provided by the newer wetting agents and synthetic detergents. These compounds possess greater stability in acid solutions and hard water than the older soaps, and as a consequence there has been a new trend toward the use of acid materials for detergent purposes. By a proper balance of these unique materials one can vary almost at will the factors which enter into the complex process of detergency; namely, wetting, dispersion of dirt particles, foaming and the emulsification of vegetable and mineral oils. The scope and significance of cleaning processes is thus greatly enlarged.

The immediate future is likely to see an expansion of the industrial cleaning field due to a greater realization on the part of industry as a whole of the important role of cleaning processes in production. This increased awareness of the importance of cleaning and surface preparation has given rise to a more scientific approach to the problems involved, which in turn is certain to lead to a greater demand for improved cleaning materials, processes and equipment.

INDUSTRIAL DISINFECTANTS

by GORDON BAIRD,
Baird & McGuire, Inc.

IN THAT there are more than two hundred compounds which have been used as disinfectants and germicides, it is impossible to cover the entire field in a brief article. Nevertheless, definite trends have been apparent in the past year or two which are of considerable significance.

During the war, in particular, management became aware of the vital necessity for proper sanitation. Labor and management may still disagree on many points, but the question of plant sanitation is one in which they are in accord. Industrial plants must be kept clean and sanitary for reasons of efficiency as well as personnel comfort. Such a crystallized realization of this fact augurs well for the disinfectant industry.

Many new products have been developed and are being used with remarkable success. Among the more prominent are synthetic phenol base products and quaternary ammonium salt germicides. Fortunately, most of the synthetic phenol compounds are inexpensive to use and are readily available for general industrial sanitation. A tremendous volume of this type of compound was manufactured during the war, and all indications point to a continued, and broadening use.

The quaternary ammonium compounds —as cationic disinfectants—are among the more recent developments. All the "wrinkles" have not as yet been ironed out, but substantial progress is being made in this respect. One fact is obvious—their success in the sanitation field is assured.

These disinfectants possess several unique features. They are high in phenol coefficient and therefore inexpensive per unit of germ kill. Too, it is claimed that certain of these products are non-irritating to the skin, non-corrosive, and non-toxic. The latter point permits use of the quaternaries in food processing plants, dairies, etc., and opens new fields for the disinfectant industry. Too, their deterioration with age is negligible.

Constant research by disinfectant manufacturers to develop new compounds, and expand the field of application for its products, has contributed much to the in-

dustry's growth. Too, within recent years, the use of sanitation chemicals by industry has increased materially, as management became more conscious of the part such agents do play.

There is every reason to believe that the industry will continue to grow, as it produces more and better disinfectants, to fulfill the nation's sanitation needs.

PULP AND PAPER CHEMICALS

by RALPH W. KUMLER,
Industrial Chemicals Division,
American Cyanamid Co.

One of the outstanding developments in the pulp manufacturing phase of the industry is the introduction of magnesium-base sulphite liquor to replace calcium-base liquor which is now universally used. This permits the recovery of the chemicals by drying and burning the waste liquor as has always been done in the manufacture of soda and sulphate pulps. Advantages to the pulp manufacturer accrue in the form of heat derived from the burning of the dried liquor and in providing a means of disposing of the waste liquor in such a way as to avoid stream pollution.

Too, there has been some tendency to substitute sodium hypochlorite for calcium hypochlorite in the bleaching of pulp. The advantages which are claimed for the sodium-base liquor are: (1) saving in chlorine which is lost in washing calcium-base sludge; (2) elimination of the necessity of disposing of sludge; (3) better control of pH in the bleaching process; (4) cleaner pulp through the elimination of lime scale; (5) saving of space and cost of equipment for carrying out the bleaching. Also, of importance is the development of the bleaching of ground wood pulp by sodium peroxide, hydrogen peroxide and sodium perborate.

SIZING MATERIALS

Within the past two years the paper industry has been considerably inconvenienced by the shortage of rosin for imparting water resistant characteristics to paper, and it was necessary for government agencies to limit the rate of consumption of rosin size early in 1945 to 70% of the rate of consumption in 1944. This forced paper manufacturers to turn to substitutes such as lower grades of rosin which were exempt from restriction and to wax sizes which were available in ample supply. Also, a new synthetic sizing material helped to some extent as, like wax sizes, it replaces several times its weight of rosin. Another product which helped to make up the shortage is bituminous emulsion. Since lifting the restrictions on rosin in April 1946 the consumption of the darker grades of rosin has fallen off to a great extent, but the use of wax sizes has declined very little. Their continued use may be attributed to factors of quality and economy which were discovered during the time they were being used through force of circumstances. Rosin supplies are now sufficient to meet the demand and the years of 1946 and 1947 will bring forth larger capacity for the production of the pale grades of wood rosins. There has been a tendency for the use of wood rosins in the manufacture of paper size to increase, relative to the consumption of gum rosins for this purpose. This trend appears likely to continue, at least well into the foreseeable future.

COATING MATERIALS

The very extensive development in the machine coating of paper has brought forth an increased demand for coating pigments and adhesives. The demand for foodstuffs has cut seriously into the supply of domestic casein as milk supplies were diverted to the manufacture of milk powders and similar products. Therefore, the production of domestic casein has been very small, placing consumers in a position of being largely dependent on imports from Argentina. The increased demand for Argentine casein has driven prices to such a point that paper coaters have been looking for substitutes.

One logical substitute for casein is starch. However, starch has been subject to the same influences as casein since it is derived from food products. Cornstarch and tapioca have been the most widely used grades but no imports of tapioca have come in since the outbreak of the war with Japan. Paper manufacturers and coaters have explored a field of possible substitutes for both cornstarch and casein which has brought into the picture more extensive use of soya bean protein and various types of potato starch.

Since starches produce less water resistant coatings than casein, chemicals have been sought to add this quality. This has brought into play such products as wax sizes and melamine, urea, and vinyl resins.

It is expected that when casein again is available at lower prices it will resume its favored position in brush coating. There are indications that the use of starch will continue in the field of machine coating in many cases.

The increase in the demand for coating chemicals has made itself felt in the field of pigments also. Neither the clay or titanium pigment supply have been adequate to meet the demand. It appears probable that this shortage will continue until additional capacity for producing such pigments comes into production.

SYNTHETIC RESINS

The war provided a powerful stimulus to the development of plastic products. And it is becoming widely recognized that paper is an excellent carrier for synthetic resins. Furthermore, the demand for improved papers has brought synthetic resins very much into the picture as modifying agents. The most outstanding examples of this are the melamine-formaldehyde and urea-formaldehyde resins for imparting wet-strength to paper. During the war these resins were principally used in military maps and the consumption fell off substantially with the cessation of hostilities. However, since that time their use in peace-time papers has grown extensively and the prospects are that only a beginning has been made in the use of resins of this type.

Another application of synthetic resins to paper which appears to be only in its infancy is the impregnation of papers with thermosetting resins which may later be used for pressure laminated products and for protective and decorative overlays. A beginning has, also, been made in the application of flexible and elastic type resins to paper for the manufacture of various specialties.

PACKAGING PAPER CHEMICALS

Development of special papers for protective coverings for food, machine parts and miscellaneous articles was, also, greatly stimulated by the demands of the military forces. Large quantities of microcrystalline waxes are used for impregnating and/or laminating various combinations of paper, cloth, transparent film and foil. While laminated papers were produced before the war the practice was given great impetus which has been sustained to a considerable degree since the declaration of peace.

Microcrystalline waxes have been largely confined to the lamination of papers since their physical characteristics are not desirable for external coatings. For the latter, various synthetic compositions are produced which involve vinyl type resins, synthetic rubber, alkyd-modified aldehyde resins, and nitrocellulose lacquers. Some thermoplastic coating resins have, also, come into prominence. Since reconversion to peace time manufacture the demands for many of these products have increased to such an extent that more acute shortages now exist than during the war. This indicates the trend toward greater consumption of synthetic coating resins which will doubtless be met by increased manufacturing facilities as soon as new plants can be erected.

TEXTILE CHEMICALS

by D. H. POWERS,
Monsanto Chemical Co.

THE textile industry during the past two years has produced more goods than in any similar period in its history. As in most industries, it has been an extremely unsettled period with serious labor shortages, some work stoppages, and the rulings of the O. P. A. affecting profoundly the output and the type of fabrics produced in entirely unplanned and unsuspected ways. It is certainly no period on which to base accurate estimates of what are the significant trends or what the future has in store.

In the conversion from wartime production to peacetime markets, the problems of the textile industry were simpler than in most industries, for instead of dyeing cottons and woolens olive drab and navy, they dyed them ecru, powder blue, and iced daiquiri.

Instead of weaving of fabrics—wartime demands greatly increased the use of vat or fast colors and the post war period has seen extensive studies continued on continuous methods for rapidly applying these colors. The gas fading of acetate colors has long been a serious problem and recent reports indicate that it has been solved by two new processes which protect the colors against the reducing action of the mildly acid fumes found in large cities and congested areas.

One process employs an amino compound, applied as a colorless dyestuff, the other melamine.

The use of plastics in textile processing is becoming increasingly important. During the severe fabric shortage "free film" of plasticized vinyl polymers were printed and dyed and show promise of gaining a real portion of the fabric market particularly for uses such as "shower curtains", washable tablecovers and especially for women's pocket books. In this latter market they are not only replacing fabrics but also fine leathers. Thers is evidence of a new industry starting in the "fiber bonding" processes where cotton fibers are "bonded" with resins avoiding the long expensive spinning and drawing processes. Up to the present time only the coarser yarns have been produced, but the future of this development promises to have a pronounced effect on the whole industry and opens new markets for polyinvyl butyrals, urea formaldehyde, and styrene dispersions.

A similar development is the "nonwoven fabrics" where card-lap or sheets of fibers are bonded or cemented together by a plastic. In this process the expensive slow weaving operations are eliminated but here again only the coarser heavier types of fabrics have been produced. In the laminating field "nonwoven fabrics" have already clearly established their superiority for certain uses to woven fabrics for performance as well as cost. This does not mean that the loom will soon be obsolete but there is clear evidence that plastic bonded fabrics will have a steadily growing, increasingly important market.

The impregnation of rayons and woolens with thermosetting resins promises greatly to widen and extend the fields for these two fibers. In the case of rayon it has been possible to overcome its softness and water sensitivity by saturating the fiber with a water soluble melamine formaldehyde resin-former. The setting of this resin within the fiber makes it muss and crush resistant and gives the fabric tremendously improved stability to washing and weather. This opens the field of suitings, wool-type dress goods and curtain fabrics which would not otherwise be available.

In the case of wool, the Army discovered the necessity of washable woolens and the postwar development of shirtings, blankets and socks are coming onto the market which can be washed instead of dry cleaned. This opens up many new fabrics and markets for wool and it is indicated that when the present fabric shortage is cared for that these new washable woolens and worsteds will become increasingly important. The trend is away from the chlorination process toward the melamine formaldehyde treatments. The former tends to degrade the wool; the latter builds it up and minimizes felting.

The war taught the importance of proofing fabrics against water, fire and mold. Cottons would have lasted only a few weeks in the tropics if they had not been especially treated. There is every reason to believe that peace time fabrics will be "proofed" more than ever before. There are available new methods of permanently proofing a fabric against water. These processes promise to have a growing market for golf jackets, rain wear and paulins.

There is on foot legislation that will require that children's clothes be fire resistant and certainly not highly inflammable. There is need for a great deal more research in this field for a better understanding of the problem but in any event fabrics with greater fire resistance will be demanded all over the country. Fabric proofed against mold and moth is possible and new methods and more active fungicides and mothicides are being developed. It is becoming increasingly evident that these proofings which protect against damage and destruction will be a part of the finishing process of the durable fabrics of tomorrow.

PROTECTIVE ORGANIC COATINGS

by JOSEPH J. MATTIELLO,
Vice-president,
Hilo Varnish Corp.

THIS section deals with the present status and the trends in protective organic coatings and the chemical raw materials used in their manufacture. The term "organic coatings" will be employed in its modern usage and will include such materials as varnishes, paints, enamels, lacquers, textile coatings, plastics, and similar special coatings materials.

It is hard to believe that ten months after World War II, the coating industry is experiencing a good deal more difficulty in obtaining raw materials than during the war period. It is not unreasonable to suppose that a very large percentage of the technical men in the industry are devoting much of their time to redesigning coatings because of the acute and shifting unavailability of raw materials. Many plants have to organize production programs from day to day.

RAW MATERIALS

In a brief article it is possible to discuss the status of only a few important raw materials, and to confine such remarks to observational highlights. The natural drying oils, linseed oil particularly, in spite of the increasing trends of the consumption of synthetic resinous materials, still constitutes the largest volume of binder raw materials used in coatings. Tung oil (China Wood) is beginning to come in again, but any considerable flow will have to wait for several years to pass. The maleic treated oils have imparted to the non-conjugated oils the cooking speed of the conjugated type and give faster drying and greater hardness to varnishes in which they are used. This type of product has replaced tung oil satisfactorily in many varnishes. Too, dehydrated castor oil, as a tung oil replacement, has also found a permanent place in practically all types of coatings.

Split, distilled, and re-esterified linseed types of oil are currently interesting. Fatty acids of linseed, or even soybean oil, can be esterified with polyhydric alcohols higher than glycerine, such as pentaerythritol. These oils are valuable from the standpoint of fast polymerization, quick-drying, good alkali-and-water resistance. Too, considerable activity ex-

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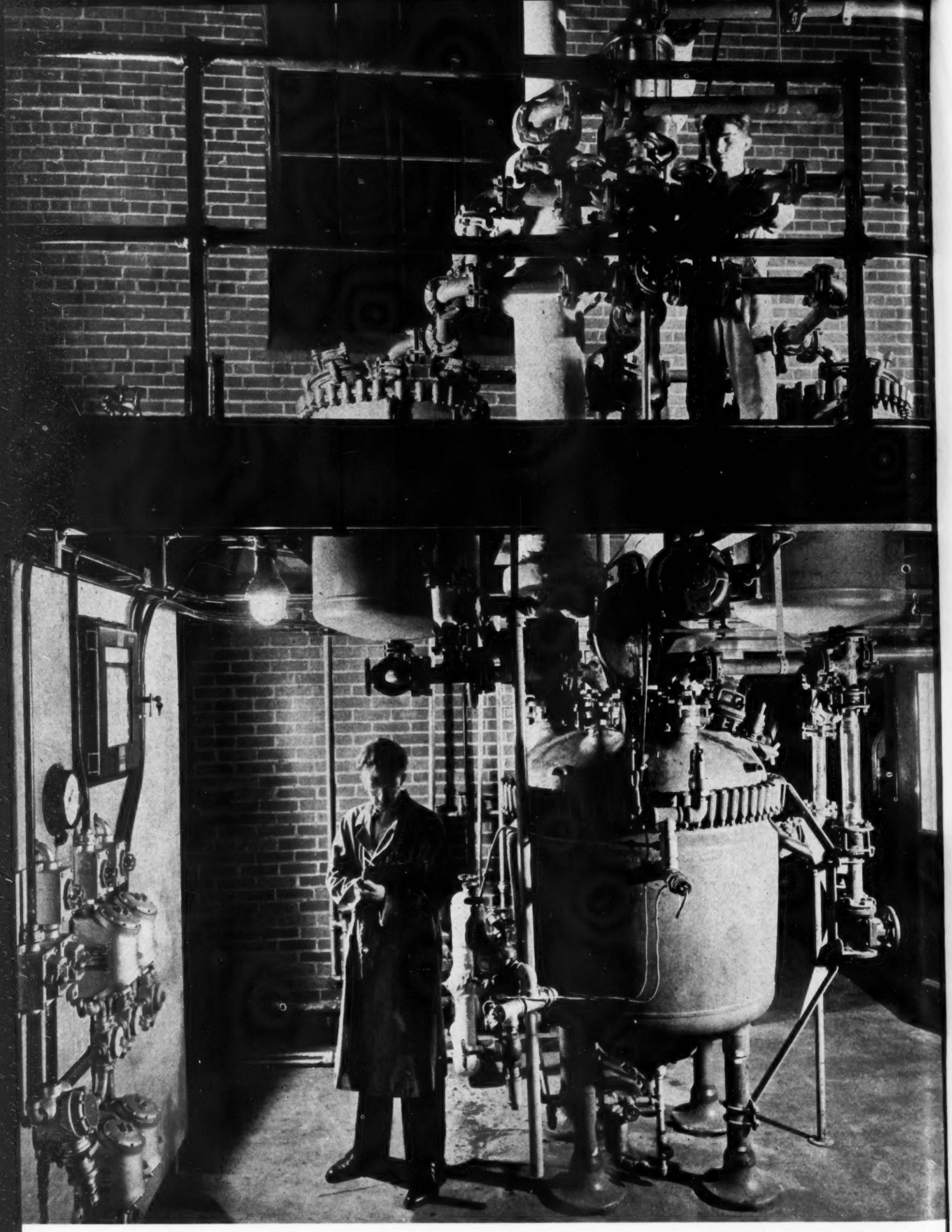

Illustration Courtesy Batelle Memorial Institute

New two-story pilot plant to provide operating and design data for production of special organic acids and esters.

Process Equipment Developments

ELOQUENT testimony to the rapid pace at which the development of new equipment for the process industries is proceeding is provided by the large number of new devices catalogued in the following pages where 171 manufacturers are represented. All of these have occurred in spite of the tremendous handicaps that have been imposed by material shortages, aggravated by labor difficulties, and the long pent up demand resulting from channeling of the product of the process equipment industries into the war effort.

Further complicating the picture is the question concerning the effect that the radically new devices resulting from the Manhattan Project will have on future designs. Military secrecy still surrounds much of this development but the gradual return to men, who have worked on this project, to their regular pursuits cannot prevent them from, either consciously or unconsciously, making use of the know-how that they acquired during this time for the provision of improvements in design of process equipment.

ALTHOUGH there have been many important developments since the last year's survey of New Process Equipment Developments by CHEMICAL INDUSTRIES it is questionable if many of the revolutionary devices, mentioned there, which were developed as a part of the Manhattan Project, have been declassified and released so that their effect on the process industries can be appraised. Until such information is available it is quite probable that any discussion of equipment developments may seem quite incomplete to those in the industry who were charged with the responsibility of producing this amazing achievement.

Some of these devices have been discussed in some detail, such as the leak detector (CHEMICAL INDUSTRIES, 58, 413 (1946), in recent releases. A discussion of the various separation processes employed for the fractionation of the uranium isotopes made up a part of the Smyth Report (CHEMICAL INDUSTRIES, 57, 450(1945). Recently, however, Manson Benedict, of Hydrocarbon Research, Inc., and formerly with the Kellex Co., in a talk before the New York Section of the American Institute of Chemical Engineers, indicated that these radically new separation processes would probably be of value to industry only where all of the other more common separation processes, such as distillation, absorption, etc., failed, and then only on materials with a very high unit value, because of the huge expenditure of energy required to effect the separation.

Nevertheless, if early official press releases are to be believed, there are a large number of devices which will represent great improvements over those outside the shroud of secrecy surrounding this achievement.

AVAILABILITY OF MATERIALS

Before entering on a discussion of the various unit operations it would be well to note that the favorable effect on industry of the many new developments, which have been cataloged in the following pages, is certain to be postponed because of the many bottlenecks that have developed in the raw materials for plant construction. It is the consensus of several suppliers and engineerings firms that the principal bottlenecks are not in fabricating capacity but in the availability of the raw material to fabricate and of such specialty items as motors and gear reducers where delivery dates of 18 months are not uncommon. Control instruments are relatively easy to obtain. One company noted that its fabricating facilities are operating at only 60% of capacity, although there were sufficient orders on hand to keep the shops functioning at 100% of capacity for many months to come.

Another offered the opinion that with the best of luck it would take at least a year and a half to erect a major plant, even after orders for all required equipment had been placed. In some cases obtainance of a CPA rating will help. One manufacturer in noting his qualms about further publicity at the present time states that, ". . . we have also found it detrimental to exasperate prospective purchasers with long delivery dates such as cannot lead to business and which create a feeling of time wasted in communicating with us." Another states, "We are still so far behind in production that we don't want to encourage correspondence."

In spite of these many difficulties, new developments continue to appear at a rapid pace.

DEVELOPMENT CYCLE FOR PROCESS EQUIPMENT

The cycle of development for all process equipment is the same and consists of three phases. First, the need to accomplish a certain operation forces development of the equipment required, if the

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process is to succeed. Second, after the initial development and use of the device a number of refinements result from observation of its shortcomings by the user and the manufacturer, producing a continuous stream of improvements on the original model. This phase of the development curve quite often ends in a plateau, which represents a comparatively dormant period in which relatively few developments occur, as the improved and perfected device is being used. Third, either some individual or group of individuals is dissatisfied with the existing piece of equipment to such a degree that thought is given to the possibility that other ways may be available to accomplish the same operation; other developments, such as the availability of an improved alloy, better theoretical data, etc., permit use of designs previously impossible with existing materials of construction; or the desire to carry some development to fruition necessitates a greatly improved device or devices—witness the Manhattan Project. When this point is reached the whole cycle begins again.

ADSORPTION

Although there are no large number of new adsorption devices noted in the tabulation it would appear that this operation is about to enter the second stage, the period of rapidly expanding usage, because of the increasingly large number of applications of ion exchange agents (CHEMICAL INDUSTRIES, 56, 789(1945) for the separation or removal of such ionic constituents as alkaloids (CHEMICAL INDUSTRIES, 57, 455(1945). Also much interest has been shown in the process developed by the Union Oil Co. of California, which utilizes a moving bed of activated carbon for the separation of hydrocarbons from lean gas streams followed by subsequent recovery of such materials as ethylene, propylene and butylene (Heat Engineering, 15, January, 1946). A similar process, using a fixed bed of activated carbon, was used by the Germans for the recovery of low-boiling products formed during the operation of the Fischer-Tropsch Process (Chemical Trade Journal and Chemical Engineer, 289, Sept. 14, 1945).

MATERIALS HANDLING

From the large number of developments tabulated for this operation it would appear to be well into the second phase of the development cycle, that is, in the region where many new refinements of the machine are constantly being made. This is particularly true for machinery designed for the more efficient handling of packaged materials whose large scale application was a product of the great wartime need for rapid handling and warehousing of all types of materials. This development may perhaps best be described by the word, palletization.

Proper use of power lift trucks and pallets allows a great saving in warehouse space because of the more efficient stacking that it permits. Another recent entry into the field is the "expendable" pallet, the cost of which is so low that it can be used under the load during the time that the material is being handled in the warehouse and then shipped away with the product when the time comes for forwarding to the consumer.

It should also be noted that lift trucks with special attachments can be used for charging furnaces, handling wire, pipe and in many other ways.

DRYERS AND HEAT EXCHANGE EQUIPMENT

As there are only a relatively few new devices noted for each of these categories it would seem that they are about ready to enter on to the development plateau. This would appear to be particularly true in the field of heat exchange, as the signal advances in the theoretical knowledge of heat transfer developed during the thirties are finally being assimilated by industry (CHEMICAL INDUSTRIES, 57, 856 (1945).

It is quite possible that the small number of new dryers announced is a product of the restrictions on research and development in this field which occurred during the war period (CHEMICAL INDUSTRIES, 57, 851(1945).

DISTILLATION AND ABSORPTION

From the number of new devices announced it appears that the development of new distillation and absorption equipment has entered on the plateau section of the development cycle. This is undoubtedly true as far as mechanical design of the contacting equipment is concerned but new combinations of existing equipment have given the industry extractive distillation, equally useful for the separation of ethanol and water (CHEMICAL INDUSTRIES, 58, 778(1946) and of toluene from the hydrocarbon product of a catalytic cracking unit.

PUMPS, BLOWERS AND COMPRESSORS

Development of new devices for forcing fluid movement continues apace, indicating a location on the second, or expansion, phase of the development cycle. The above applies equally well to equipment designed for the propulsion of either liquids or gases.

PIPE AND FITTINGS

Because of the many different types of

FILTERS—New Equipment Announced 1945-6

Type of Equipment	*Sizes*	*Construction Materials*	*Distinguishing Features*	*Applications*	*Company*
Asbestos Pad Filters	Laboratory or production models	Stainless steel or nickel-plated bronze	Self-seal construction	Ultra-filtration of water, biologicals, etc.	F. R. Hormann and Co., Inc.
Filter Medium	Pore openings 4-165 microns	Stainless steel	Strong, ductile, thin sheets which can be bent into a small radius	Filters, aeration units, flame arrestors, etc.	Micro Metallic Co.
Water Filter	100 to 10,000 gals. per hr.	Stainless steel or bronze	Freeboard provided for dry carbon which is placed in filter in bulk and deposited on plates by incoming water	Filtration of drinking or process water	Sparkler Mfg. Co.

GRINDING—New Equipment Announced 1945-6

Type of Equipment	*Sizes*	*Construction Materials*	*Distinguishing Features*	*Applications and Limitations*	*Company*
Ball Mill		Abrasion-resisting steel	Herringbone lift bars, flat end plates, roller bearings, integral discharge valve and forged steel trunnions		H. K. Porter Co.
Grinding Mill	3' x 4' to 6' x 14'		Halves time required by ordinary ball mill. 50% more weight of grinding media. 25% more ball surface by use of 2" balls instead of 2½" balls. Less than ½ of usual number of cemented joints	Grinding of enamel frit, paint and other products which may be contaminated in steel mills	Patterson Foundry and Machine Co.
Ultra-Fine Pulverizer	5-200 lbs. per hr. 5 HP motor	18-8 stainless steel with a high nickel iron. Other machinable alloys available for special applications	Can reduce particle sizes down to 1-25 micron range by rotating hammers	Small quantity production, pilot plant or laboratory work	Pulverizing Machinery Co.

equipment represented by this broad general classification it is practically impossible for any particular phase of the development cycle to apply. However, the very number of the new developments most certainly places many of the classes of equipment covered by the term, pipe and fittings, in the second or expansion phase of the cycle.

Of particular interest is the preparation of corrosion-resistant steel pipe by electroplating nickel on the inner surface of the pipe (CHEMICAL INDUSTRIES, 58, 51 (1946).

PROCESS CONTROL INSTRUMENTS

This classification, representing by far the largest number of new developments, is undoubtedly in the second or expansion phase of the development cycle. Much of this activity is due to the absolute necessity for exceedingly close control of the flow of reactants, temperature, pressure, etc., if modern processes are to be economically operable. Much is also due to the increasing application of electronic circuits to process measurement and control (CHEMICAL INDUSTRIES, 58, 256, 420, 586, 785, 982(1946).

GRINDERS

Grinders for reduction of particle size to the micron range, such as the ultra-fine pulverizer noted in the accompanying tabulation, have been receiving a great deal of attention the past few years and would appear to occupy the end of the second phase of the development cycle, or the beginning of the third.

Another evolution now in the first phase of the development cycle is the disintegration of matter by saturation with high pressure air followed by the subsequent release of pressure. The initial purpose of this device is to provide powdered fuel for a coal-fired gas turbine locomotive.

OTHER UNIT OPERATIONS

Study of the few new developments announced for the unit operations of mixing, filtration, sedimentation, centrifugation, dust collection and crystallization indicate that they are in the dormant stage of the development cycle.

PUMPS, BLOWERS AND COMPRESSORS—New Equipment Announced 1945-6

Type of Equipment	*Sizes*		*Distinguishing Features*	*Applications*	*Limitations*	*Company*
Angle Compressor "BA" 17	17" bore and 17" stroke; 200 Brake HP per cylinder		Gas engine driven compressor developing more HP per unit of space than any other compressor of this type	Large installations		Clark Bros. Co.
Centrifugal Pump	15-750 gpm.	Iron, bronze or steel	Multi-stage pump with complete radial and axial balance. Water-cooled, oil ring lubricated bearings	Boiler feeding, general service	350-700 lbs. pressure	Warren Steam Pump Co., Inc.
Centrifugal Pump	15-600 gpm.	Iron, bronze, steel or stainless steel	Head = 110-250 ft. water	Cold acids and general service		Warren Steam Pump Co., Inc.
Centrifugal Pump	5-450 gpm.	Iron, bronze, steel or stainless steel	Close-coupled with mechanical seal. 15-500 ft. = head	Cold acids and general service		Warren Steam Pump Co., Inc.
Diffusion Pump, Type 108 H-10			10" diffusion pump with a minimum pumping speed of 3000 cfm in the pressure range of 2 and 0.01 microns	Where high pump speed is required at high vacuum		National Research Corp.
Diffusion Pump, Type 107 B-6			6" booster type pump maintaining high pumping speed at 100 microns	Use in the pressure range between that handled by steam ejectors and ordinary diffusion pumps		National Research Corp.
Double Impeller Gearless Pump	7.5 gpm. @ 600 rpm.	Pressure-vulcanized, laminated impeller. Bronze body	Pumps in either direction. Impeller passes grit without damage to body			Eco Engineering Co.
Exhaust Fan	36", 42", 48", 54" and 60" ¾ HP. motor	Cold rolled steel or monel	High slip, slow speed, direct drive with permanently greased and sealed bearings	Industrial exhaust or ventilation	Max. speed = 375 rpm.	Moore Co.
Hydro-Steam Vacuum Unit	HP. from 1.5-7.5		Water jet vacuum pump followed by 1, 2 or 3 stages of steam jet boosters. No barometric leg			Schutte and Koerting Co.
Jet Pump		Either metal or plastic	Portable eductor		Lifts water up to 75 ft.	Schutte and Koerting Co.
Lubrication Pump	0.08-1.5 gpm.	Aluminum body and nitrided nitralloy spur gears	Direct drive gear pump operating at 1140-3450 rpm. Power requirements 1/100 to ⅛ HP.	Pressure lubrication and fluid handling	Max. P = 150 psi.	McIntyre Co.
Positive Displacement Pump	50-10,000 g.p.h.		Positive displacement, constant volume, high vacuum pump. Operates at 100 psi. and 1740 rpm.	Fluid transfer, metering or proportioning		Marco Co.
Pressure Blower	36", 42", 48", 54" and 60".	Monel	Pressure blower which may be custom assembled with proper number and pitch of blades to deliver a given volume and pressure of gas	Mine fan, cooling tower fan for damp or corrosive atmospheres	Max. speed = 900 rpm. HP. = 7.5	Moore Co.
Process Pump	10-800 gpm. @ 230' head		Parts subject to wear separated, reducing weight and cost, and allowing use of special non-machinable alloys			Allis-Chalmers Mfg. Co.
Proportioning Pump			Diaphragm type for positive injection of one or two chemicals at predetermined and adjustable rates			% Proportioneers, Inc., %
Proportioning Pump	Up to 10 gal. per hr.		No packing glands. Adjustable diaphragm type chemical feeder with flow accuracy from minimum to maximum of 1:100		Max. P = 5,000 psi.	Process Equipment Div. Lapp Insulator Co.
Rotary Pump	200-1050 gpm.	All iron, bronze, or steel fitted, or all bronze	Extra heavy construction, valve in head, liquid cooled stuffing box and integral thrust bearing		Liquid must be clean. Max. P. = 150 psi.	Viking Pump Co.
Rotary Pump	10-300 gpm.	All iron, bronze, steel fitted, or all bronze	Extra heavy construction, valve in head, revolvable casing for easy port positioning and integral thrust bearing		Liquid must be clean. Max. P = 200 psi.	Viking Pump Co.
Self Priming Pump	¼"-1½" 0-35 gpm.	Bronze. Stainless steel (Type 317) in 1" only	Synthetic rubber impeller; high vacuum (>26"). Pressures over 40 psi.	Liquid-solid mixtures can be pumped	T = −40°F. −180° F.	Jabsco Pump Co.
Solids Handling Pump	175-7000 gpm. Heads thru 100 f.		New design and new abrasive-resistant alloy	Metal, coal and process industries		Allis-Chalmers Mfg. Co.
Strainer	100 gpm. 2, 2½ or 3" intake	Steel or bronze	Perforated metal strainer basket	Pump protection	Max. P. = 75 psi. Max. T. = 600°F	Blackmer Pump Co.

ADSORBERS—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Applications	Limitations	Company
Dryer, "636"	Adsorbent in a 6" OD Pipe		Fiberglas, calcium chloride or activated alumina filling	Gas drying	Fiberglas removes only entrained water	Gasflux Co.
Gas or Liquid Dehydrator	12 sizes from 0.6 lb. to 216 lb. H_2O removed per cycle		Drying by adsorption enables a dew-point of —80° F. to be reached	Drying gases and liquids	Max. P. = 3000 psig.	J. F. Pritchard & Co.

MIXERS—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Applications	Limitations	Company
Side-Entering Agitator		Any machinable alloy can be specified for housing	Housing cast in one piece and packing gland equipped with needle bearing and packing is in front of bearing housing	Mixing all materials of very low viscosities		H. K. Porter Co.
Versator	7-100gpm.	Steel, stainless steel, nickel, monel, Inconel, and Everdur	Extremely sensitive materials not thermally decomposed because of short contact time (1/7 second). No mechanical pressure is used, thus no temperature rise—important in homogenizing and emulsifying heat sensitive materials	Solid-in-liquid dispersions, emulsification and homogenization	No way of predicting performance without empirical tests	Cornell Machine Co.

HEAT EXCHANGE—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Applications	Limitations	Company
Bulk Tank Preheater	38 ft.² of radiation surface	Steel	Coil of 1½" steel pipe so constructed that it can enter a 16½" manhole to preheat heavy liquids in bulk storage. Steam or hot water heat		Max. P. = 400 lbs.	Rempe Co.
Cascade Cooler	Up to 120 sq.ft. of surface per unit in five sizes	Karbate	Corrosion resistance because of all carbon construction	Service with practically all acids, caustics and organic solvents. Max. P. = 75 lbs. per sq.in. Max. T. = 170° C.		National Carbon Co.
Condenser Tube Insert	⅝, ¾, ⅞, and 1"	Plastic	Insert placed in condenser tube end to prevent erosion			Condenser Service and Eng. Co.
Dielectric Heater	10¼" x 13" preform tray and lower electrode		High frequency dielectric heater which will raise the T approximately 170° F. per minute. Narrow width (16.5") allows it to slip in between presses. Automatically controlled predetermined heating cycle			Girdler Corp. Thermex Division
Dielectric Heater	2kw. output		Heat sequences from two seconds to twenty minutes may be chosen. Operates at 27 megacycles			Allis-Chalmers Mfg. Co.
Dryer	2000-10,000 lbs. dried product per day	Aluminum, stainless steel, or iron and transite	Rotating trays set in vertical position so set that material passes downward over each tray as it is being dried. Both fin type and smooth surface heaters available	Drying pastes, thick slurries or granular materials		Wyssmont Co.
Electric Furnace	I.D. 3" x 3" 3". O.D. 8.5" x 10.5" x 8.5"		Automatic control for any T from 200-1750° F. from 110 AC. and power consumption of only 500 watts			K. H. Huppert Co.
Electric Furnace	I.D. 5½" x 3⅝" x 6"		High temperature electrical furnaces with automatic control		Max. T. = 2200° F. continuous service or intermittent to 2250° F.	K. H. Huppert Co.
Electrical Heat Exchanger			Electrical resistors encased in a fin tube. Current density = 4KW per linear foot of tube	For use to prevent need of auxiliary piping for steam or for heating to temperatures above that obtainable with steam		Brown Fintube Co.
Hairpin Cooler		Gray cast iron	Cast element for cooling acid cooling vats or cooling of alkalies			National Radiator Co.
Heat Exchanger Tube Inspection			Instrument attached to probe records all types of irregularities in tubes constructed of non-magnetic metals			Shell Development Co.
Induction Heater	775 watts used on full load		Portable bench type heater. Frequency = 450 kilocycles	Soldering of small parts		Marion Electrical Instrument Co.
Liquid Cooler	4.7 to 137 tons of refrigeration		Water to be cooled is sprayed over coils in which refrigerant is expanded			Niagara Blower Co
Refrigeration Condenser			Two condensing coils, the first, a dry coil, the second sprayed with water	Refrigeration equipment		Niagara Blower Co.
Refrigeration Heat Exchanger		Steel or steel with finned copper tubes	Shell and tube design	Industrial refrigeration and air conditioning		Downington Iron Works
Refrigeration Heat Exchanger A. Process Cooler B. Extended Surface Process Cooler and Refrigerant Condenser	2-100 tons of refrigeration 2.5-150 tons of refrigeration	Any commercial alloy or combination	Weldless refrigerant chamber or bonnet, alloy bolting and insulating cradles	Cooling or condensing various materials		Patterson-Kelly Co. Inc.
Shell and Tube Exchanger	10-1000 ft.² 4"-24" dia.	Stainless steel, nickel, Inconel and monel	Standardization of alloy construction. Fixed tube sheet, outside packed floating head, internal floating head, and "U" tube construction	Condensers, heaters, evaporators, etc.		Pfaudler Co.
Tube Heaters	5-100 ft.² surface	Karbate tubes with lead or rubber-lined liquor heads	Acid-resisting, replaceable tubes by use of Swenson-patented gaskets to hold tubes in tube sheets	Rayon plants, etc.	Max. P. = 50 psig steam	Swenson Evaporator Co.
Water Heater	Cap. = 600-5500 gals. per hr. for 100° F. rise	Bronze	Steam at 50-150 psi. is diffused directly into water. Noise greatly reduced by muffler type diffuser. Adjustable to 20° F. ranges from 100-200° F.	Water heating		O'Brien Steam Specialty Co.

DUST SEPARATORS—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Applications	Limitations	Company
Air Filter	24"x24"		Electronic air filters using electrostatically charged paper for removal of atmospheric dust or smoke		1000 cfm. = capacity per unit	American Air Filter Co.
Air Filter	2'x3'		Electronic air filter with a removable collector plate. Several units may be mounted in series, to a maximum standard height of 15' in 9" increments		Cap. = 1000 cfm. per unit	American Air Filter Co.
Bag Type Collector	300-1350 cfm.		Location of inlet air fan permits unit to be installed in corners	Decentralized small-scale processes	Units are designed for intermittent not continuous operation	Northern Blower Co.
Dust Collector	500-30,000 cfm.	Steel and stainless steel	High efficiency wet-type collector. Removes both fumes and vapors and to promote reactions between gases and liquids			Claude B. Schneible Co.
Dust Trap (Velocitrap)	2000-20,000 cfm.		Solids separated from airstream by a slot-shaped opening in an elbow within the duct. Particles pass through the slot into a hopper by means of centrifugal force			Claude B. Schneible Co.
Semi-Portable Collector	360 and 720 sq. ft. of cloth area		Bag type collector with mechanical bag shaking	Decentralized small scale processes	Units to be operated intermittently, not continuously	Northern Blower Co.

DRYING—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Applications	Limitations	Company
Cabinet Oven		Insulated steel panels	Self contained gas or electric heated system allows quick removal of volatiles in this shelf-loading oven			Gehnrich Oven Division; W. S. Rockwell Co.
Dehydration Unit			Pilot plant operation or limited volume production of biologicals, pharmaceuticals and heat sensitive fine chemicals by the high vacuum process			National Research Corp.
Gas or Liquid Dehydrator	12 sizes from 0.6 lb. to 216 lb. of H_2O removed per cycle		Easy access of instruments and controls. Drying is by adsorption and a dew point of —80° F. can be reached	Drying gases and liquids	Max. P. = 3000 psig.	J. F. Pritchard & Co.
Industrial Oven	2' x 2' x 3' to 4½' x 6' x 9'		Requires only hookup to gas or electric connection. Special loading dolly and shelf	Drying and baking of lacquers and enamels	Max. T. of 500° F.	Despatch Oven Co.
Laboratory Dryer	31" x 36" x 25"	Sheet metal with rock wool and cork insulation	Automatic temperature control and positive circulation. Electrical heating	Laboratory drying	Max. T = 300° F.	Proctor & Schwartz Inc.
Laboratory Dryer		Stainless steel	Twin blowers, thermostatically controlled electric heater	For tests requiring minimum Δt in cabinet	Max. T. = 180° C.	Electric Hotpack, Inc.
Spray Dryer	8-100 lb./hr.	Stainless steel	Small size, and complete flexibility with countercurrent flow	Drying of foods, drugs, plastics and chemicals	Melting point must be under 160° F. or below 0.5% H_2O	Research Equipment Engineers

SAFETY—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Material	Distinguishing Features	Applications	Limitations	Company
Aprons	29" x 40" and 33" x 40"	Plastic	Electronically welded seams on transparent plastic			Pulmosan Safety Equipment Corp.
Aprons		Plastic	Transparent plastic 0.006-0.008" thick			Safety Clothing and Equipment Co.
Breathing Apparatus			Utilizes compressed air tank to provide pure air without use of air lines			Scott Aviation Corp.
Breathing Apparatus			Chemical canister generates oxygen supply in place to allow working in dangerous locations		One hour time limit	Mine Safety Appliances Co.
Chemical Goggle			Metal side shields, ball chain bridge and Armorplate or Calobar lenses	Calobar lens for welding		American Optical Co.
Fire Control Nozzle			Water fog produced in fixed installations by forcing water through three spiral passages and a clear central passage of nozzle. No internal obstructions	Protection of tanks containing flammable fluids		Blaw-Knox Co. Sprinkler Division
Fire Extinguisher	2-100 lbs. of carbon dioxide		Portable carbon dioxide extinguisher	Electrical fires or oil, grease and other flammable liquids		General Detroit Corp.
Fire Extinguisher	15 lbs. of carbon dioxide		Trigger-touch extinguisher	Electrical fires or oil, grease and other flammable liquids		Randolph Laboratories
Fire Extinguisher			Dry chemical extinguisher. Solid residue cuts down reflash	Electrical fires or oil, grease and other flammable liquids	Projection distance = up to 18'	Pressurelube, Inc.
Fire Extinguisher	750 lbs. carbon dioxide		Wheeled tank of liquid carbon dioxide. 50 ft. of hose		Application rate = 300 lbs. per min.	Cardox Corp.
Industrial Clothing			Textile sheeting coated with Koroseal. Jackets and pants furnished separately			B. F. Goodrich Co.
Plug for Tank Leaks		Rubber-covered	If leak occurs a hole is drilled at that point and plug attached by a lock washer and nut on the outside			Perma-Line Rubber Products Co.
Safety Siphon		Plastic	Flow control valve allows flow to be adjusted from a full flow to a trickle	Safe discharge of 5 to 13 gal. carboys and 50 or 55 gal. drums		Alden Speare's Sons Co.
Sleeves	18" long	Plastic	All seams electronically welded			Pulmosan Safety Equipment Corp.
Work Glove		Canvas impregnated with neoprene	Rough adhesive surface prevents slips. Has either a knit or gauntlet wrist			Pioneer Rubber Co.

DISTILLATION AND ABSORPTION—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Applications	Limitations	Company
Absorption, Reaction and Distillation Towers	12"–48"	Stoneware	Flanged construction allows operation at higher pressures than with bell and spigot towers	Absorption, reaction and distillation	Max. T. = 300° Max. P. = 25 psig.	General Ceramics and Steatite Corp.
Tower Packing—Fischer Rings	½", 1" and 1½"	Porcelain	New shape gives 10-20% greater efficiency than Raschig rings	All tower reactions. Possible replacement for bubble caps		General Ceramics and Steatite Corp.
Versator	7-100 gpm.	Steel, stainless steel, nickel, monel, Inconel, and Everdur	Extremely sensitive materials not thermally decomposed because of short contact time (1/7 second). Distillation takes place from micro-film	Evaporation, dehydration and distillation of heat-sensitive materials	No way of predicting best way of processing. Empirical tests must always be conducted	Cornell Machine Co.

AUXILIARIES—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Material	Distinguishing Features	Applications	Limitations	Company
Adjustable Drive	25 H.P. at 600-1800 PRM.		Self-contained electromagnetic torque transmitter used with a constant speed AC motor and electronic controller for split revolution speed control	Speed control for pumps, blowers, compressors, etc.		Electric Machinery Manufacturing Co.
Gasket		Armco iron, low carbon steel, monel or stainless steel	Gasket consists of two discs of metal, machined and serrated or their external faces and welded around the outer periphery, allowing the internal pressure to aid in holding seal			Goetze Gasket and Packing Co.
Gasket			Chrome lock is stated to be the only gasketing giving adhesion to metals without cementing			Products Research Co.
Gasket—Spiral Wound		Any metal with various fillers — can be jacketed	Reusable, low bolt load and built to any desired hardness with high recovery	Fired or unfired pressure vessels, flange joints or hand holes	No concave sections — usable only on a flat surface	United States Gasket Co.
Insulating Beads	0.056" ID. and 0.125" long to 1/16" ID. to 1.5" long	Porcelain	Beads designed to form a continuous flexible insulating line for all types of wire			Harold E. Trent Co.
Magnetic Separator	Over belt width 12"-60"	Steel and copper	Continuous removal of iron from magnet face. Max. burden thickness = 6". Max. belt speed = 850' per min.			Dings Magnetic Separater Co.
Motor			Small low inertia motor for remote control applications	Servo motor	Can be wound to operate at from 10-80 volts	Transicoil Corp.
Motor	1-1000 H.P.		Totally enclosed, fan-cooled motor. Explosion-proof and dust-proof	For use in dusty, dirty or corrosive atmospheres		General Electric Co.
Motor Starter	5-100 H.P., 220 volts, 200 H.P., 440, 550 and 600 volts		Largest starter made in solenoid construction. Only one moving part	Starting AC across-the-line squirrel cage motors		Allen-Bradley Co.
Motor Control			Provides fingertip preset positioning control of motor-operated adjustments such as variable speed transmission and other motorized controls			Yardeny Laboratories, Inc.
Pulsing Drive Motor Control	Will control motors up to 35 H. P.		Provides precise inching and fast travel on all types of motors for spotting conveyors, etc.			Yardeny Laboratories, Inc.
Paint Can Hook		Steel	Hook which permits can to be hung on either the right or left side of the ladder			T. G. Persson Co.
Relay	10 amps, non-inductive load. 25-60 cycle, 6-600 volts		Contacts on this solenoid relay can be connected normally open or normally closed. No contact maintenance. Only one moving part	Circuit control	Cannot be used as a reversing switch	Allen-Bradley Co.
Selenium Rectifier	25 mils up to hundreds of amps		Light weight. (AI used wherever possible) hermetically sealed unit	AC-DC conversion		Radio Receptor Co., Inc.
Solder			Solder has three independently filled cores, filled with pure rosin flux	Faster work because of thinner metal walls		Alpha Metals, Inc.
Static Electricity Eliminator			Static electricity eliminated from moving machinery, belts, textiles, etc., by using a minute quantity of a radioactive material to ionize the gas surrounding the device and drain the static electricity away		Effective zone of ionization = 3"	United States Radium Corp.
Vibration Dampener	Up to 8" dia.	Rubber cushion to eliminate shaft vibration				Raybestos-Manhattan, Inc. Manhattan Rubber Division
Wire Cloth	Wire dia. = 0.001"	Monel	400 mesh metal cloth with an opening of 0.0015"			Newark Wire Cloth Co.
Wire Rope Clamp	⅛"-¾"	Alloy steel	New wedging feature on clamp. Cadmium-plated for weather resistance			Nunn Mfg. Co.

MATERIALS HANDLING—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Applications	Limitations	Company
A. POWER TRUCKS						
Articulated Fork Truck	54" long, 4000 lb. capacity		Articulation saves floor space and improves spotting of loads. New method of steering. Battery power	Warehousing and car-loading		Baker-Raulang Co.
Fork Truck	1000 lbs. capacity		Gas or battery powered, solid or pneumatic tires and short wheel base and turning radius	Lifting and carrying material in narrow aisles and in small elevators	Max. load = 1000 lbs. Max. lift = 84"	Clark Tructractor Co.
Fork Truck	4000 lbs. cap.		Electrically powered fork lift truck, for use in narrow aisles (12 ft. wide)			Lewis-Shepard Products, Inc.
Fork Truck	4000 lbs. capacity	Steel plate	Two speeds each way. Finger-tip control of hydraulic elevator. Battery power	Palletized loads		Yale and Towne Mfg. Co.

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MATERIALS HANDLING—New Equipment Announced 1945-6. (*Continued*)

Type of Equipment	*Sizes*	*Construction Materials*	*Distinguishing Features*	*Applications*	*Limitations*	*Company*
Hand Tractor	3 tons continuously or 10 tons intermittently		Front wheel drive, battery-powered, finger-tip controlled hand tractor. Trailers can be towed		Not a lift truck	Automatic Transportation Co.
High-Lift Hand Truck	Overall ht. = 83"		High lift hand truck. Battery-powered hydraulic lift up to 64-68". Both platform and pallet models available	Where volume of material handled does not warrant investment in a fork truck	Load cap. = 2500-4000 lbs.	Automatic Transportation Co.
Industrial Truck	10 tons capacity. 45"x147"		Six wheel, battery powered platform truck. Battery power gives speeds up to 6 mph.		Not a lift truck	Elwell-Parker Co.
Industrial Truck	2 tons capacity		Finger-tip controlled, battery-powered platform truck. Forward or reverse speed of 312 ft. per min. empty or 220 ft. per min. loaded		Batteries operate 20 hrs. without recharging. Not a lift truck	Lift Trucks, Inc.
Lift Truck—LT 35	1 ton capacity. 35" wheelbase		Side-mounted motor. Hydraulic lifting and short turning radius	Operable with load on elevators with 2-ton capacity		Towmotor Corp.
Motorized High Lift Truck	2500-4000 lbs. capacity		Electric powered, hydraulic lift with either fork or platform. Finger-tip control	For uses where volume of material handled precludes investment in standard truck	68" lift	Automatic Transportation Co.
Platform Truck	6000 lbs. capacity	Steel plate	Two speeds each way. Finger-tip control of hydraulic elevator. Battery power			Yale and Towne Mfg. Co.
Shop Truck, Model HB	1 ton. 12.7 ft.² loading area	Welded steel frame	Dual wheel platform truck with short wheel base. 4 cycle engine gives speeds up to 15 mph.	Load carrier in warehouses, docks, etc.	15' aisle needed to turn in	Buda Co.
B. HAND TRUCKS	500 lbs. capacity	Welded steel	Two wheel hand truck with 8" x 13" bottom plate. Ball bearing wheels with hard rubber treads			Yarco Distributors
Hand Truck	500 lbs. capacity	Welded steel	Two wheel hand truck with 9" x 14" bottom plate	Handling barrels, bags or crates		Schmidgall Mfg. Co.
Hand Truck	Tested under a 5000 lb. load	Cast aluminum	Two wheel truck weighing as little as 3 lbs. Larger units have clips on sides to hold barrels			Northrop-Gaines Inc.
Utility Truck	23⅛" x 33⅛" x 36"	Steel	Four wheels, swiveled in the rear. 1-4 platforms can be used			Drinkwater, Inc.
C. CONVEYORS						
Apron Conveyor	Centers from 4'7" to 9'1" in 18" increments	Steel chain belt	Roller supported apron feeder. Normal speed = 10 ft. per minute			Chain Belt Co.
Belt Conveyor	Adjustable up to 35° angle		Portable, adjustable from a horizontal position to an elevation of 102" at one end and 12" at the other. Weight adjusted by a hydraulic jack		Max. load @ 35° = 150. lbs.; horizontal = 250 lbs.	Speedways Conveyors, Inc.
Bucket Carrier			Double bucket carrier carrying operator between the two buckets. Motor drive gives speeds up to 600 ft. per min.	Tramrail carrier		Cleveland Crane and Engineering Co.
Cable Lift			Turning of crank raises or lowers delivery head end of portable power belt conveyor to facilitate pitch adjustments when operating at differing levels			Rapids-Standard Co.
Compartment Feeder		Special designs for handling corrosive liquids available	Simplex, duplex or multicompartment feeders available. Feeds different chemicals in different quantities to different parts of the circuit			Denver Equipment Co.
Conveyor Trolley			No wheel shafts or spindles and no separate compartment for ball bearings			Link Belt Co.
Oscillating Trough Conveyor		Steel trough	Oscillating, flexibly supported, rectangular-shaped plate gives a forward travel of 20-50 ft. per min.	Handling hot materials where no spillage is desired		Link Belt Co.
Portable Belt Conveyor	7.5', 8.5', 9.5', 10.5' and 12' long		Easy to adjust through 30° for packaged goods. 75 fpm. =speed—reversible	Piling, loading and carrying boxes, bags or cases	Max. wt. per item = 135 lbs. Max. total load = 220 lbs.	Standard Conveyor Co.
Portable Belt Conveyor	11' and 15'0" long		Belt piler with projecting boom for long reach piling. No projecting siderails	Piling and loading bags or boxes	Max. wt. of package = 135 lbs. or continuous load of 25 lbs. per ft.	Standard Conveyor Co.
Portable Packaged or Bulk Material Conveyor	14' and 20' lengths. 10" belt		Gasoline or electric power with detachable sideboards with hopper and chute for use as a bulk material conveyor	Handling packaged material or bulk material up to 14" top size		Material Movement Industries
Retractable Loader	28'4" long		Cantilevered belt conveyor. Reversible and a complete machine projecting up to 19 ft.	Loading and unloading trailers, trucks and railroad cars	Max. load = 20 lbs. per ft. Max. width = 18"	Standard Conveyor Co.
Troughing Idler for Belt Conveyor, No. 35			Rubber cylinder with multiple grooves for impact cushioning. Idlers so arranged that they cause trough to form in belt			Chain Belt Co.
Package Conveyor	14' and 20' lengths, 10" wide	Rubber belt	Gasoline or electric-powered continuous belt conveyor			Material Movement Industries
D. MISCELLANEOUS						
Dollies	18.5" x 10.5" x 4". 3¾" wheels	Steel and Wood	Pairs of low (4") dollies to facilitate moving of heavy objects—10-12 ton load			Techtmann Industries, Inc.
Expendable Pallet	42" x 48"	Wood	Double corrugated board top on square or round blocks dipped in water-resistant adhesive	Low cost expendable pallet	4000 lbs. = load	Techtmann Industries, Inc.
Drum Sling	$\frac{A}{12}$" wire rope	Hot dip galvanized iron	Clips on a rod with adjustable pressure spring hold drum until it is deliberately released	Hoisting drums	Load = 8000 lbs.	Wind Turbine Co.
Industrial Wheels	6", 8", 10" and 12"		Sealed-in lifetime bearing lubrication. Breather holes in casting allow tire to expand in and thus prevent bulging	Industrial trucks, etc.		Thermoid-Grizzly Wheel Sales Division Thermoid Co.
Industrial Wheels	6", 8", 10" and 12"	Cast aluminum with rubber tires	Lifetime lubrication of tapered bearing for heavy duty	Industrial trucks, etc.		Northrop-Gaines, Inc.
Skid	8' long and 14" wide	Wood and steel	Claimed to be lighter and stronger than previous designs			Palmer-Shile Co.

CLASSIFICATION AND SEDIMENTATION —New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Outstanding Features	Applications	Limitations	Companies
Screener (70-Series)	Up to 6'8" by 15'		Single, double or triple deck screeners	Separating wood chips in mfr. of paper pulp		Orville Simpson Co.
Sedimentation Unit	Designed to size		Cellular construction of settling basin, accurate flow, long weir length ensures low upward velocity and low turbidity effluent. Can be operated as a thickener	Sedimentation of any solids for a highly clarified effluent	Don't use where flotation of light solids is a problem	Chain-Belt Co.

PIPE AND FITTINGS—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Applications	Limitations	Company
A. PIPE LINE STRAINERS						
Duplex Strainer			Lucite casing provides visual inspection to show need of cleaning			J. A. Zurn Mfg. Co.
Disc Type Strainer		Cast bronze, semi-steel, steel or cast iron: basket in brass, monel or other metals	Duplex type assures continuous flow. Removable covers give easy access to basket chamber for cleaning	Protection of all type liquid flow equipment		J. A. Zurn Mfg Co.
Glass Strainer	1"-3" I.D.	Heat resistant glass	Screen is always visible	Use with glass pipe		Corning Glass Works
Stoneware Strainer	1"-4" diameter	Stoneware	Complete corrosion resistance with all stoneware construction	Acid pipe lines	Max. T. = 300° Max. P. = 50 psig.	General Ceramics and Steatite Corp.
"Y" Strainer		Cast bronze, steel, semi-steel or cast iron	Strainer sleeve fits snugly but is easy to remove for cleaning			J. A. Zurn Mfg. Co.
B. COUPLINGS						
Hose Coupling	½", ¾" and 1¼ diameter	Bronze casting	Full diameter of hose maintained throughout. Remountable coupling for ease of repair in the field		Over 1000 psig.	Bar-Way Mfg. Co.
Hose Coupling	⅝" and ¾" diameter	Aluminum	Coupling between faucet and hose		Max. P. = 600 psi.	E. B. Wiggins Oil Tool Co.
Coupling	St'd. thread sizes from ¼"-2"	Aluminum, brass or alloy steel	Used with either hose, pipe or flared tubing		Operating T. = −65° to 300° F. Max. P. = 1680 psi. for 2" and 11,500 psi. for ¼" unit	Roylyn Mechanica Laboratories
Pipe Coupling	11 sizes from 1.25" to 16"	Rubber or neoprene gaskets	Usable on unthreaded pipe. Two sections fit over pipe end and are tightened by a wedge key which is attached to a chain on the smaller sizes	Flexibility in usage and repairing of leaks	Max. flexibility = 40°	Drinkwater, Inc.
Tubing Fitting	⅛"-1½" O.D.	Brass, aluminum or steel	Fitting using a gripping ring and gasket eliminates flaring or soldering			Gustin-Bacon Mfg. Co.
C. PIPE, TUBING AND DUCTS						
Duplex Tubing	½"-2"	Admiralty, copper, aluminum brass, aluminum bronze, or cupronickel in combination with aluminum, steel, monel or stainless steel	Withstands corrosion of two entirely different types on the inside and outside			Bridgeport Brass Co.
Flexible Duct		Fabric in combination with rubber or plastics	Flexible corrugated duct. No wire reinforcements and flexibility obtained by means of corrugations	Conveying air, dust, fumes and abrasive materials	T. range = −70° F. to 350° F.	United States Rubber Co.
Flexible Tubing	⅛"-¼" I.D.	Stainless steel	Tubing with flexibility provided by deep helical convolutions. Covered with a metallic braid jacket			Seamlex Co., Inc.
Flexible Tubing	3"-16" dia. 10', 15' and 25' lengths	Long fiber duct on a steel spring	Cloth stitched to a steel spring allowing retractibility as well as compressibility. Fire resistant	Handling air, gases or light solids	Max. P. = 170 psi.	Warner Brothers Co.
Nickel-Plated Pipe	20' long from 2"-18" O.D.	Steel pipe, with nickel plate liner	Corrosion resistance of nickel given to steel pipe by electrodeposition. Plate so adherent pipe can be drawn to thin-wall tubing. Complete piping service can be provided	Where corrosion resistance of nickel is desired		Bart Manufacturing Co.
Nickel Steel Tubing		9% Ni in steel	For plants handling liquefied gases and other low temperature fluids		Lower limit of T = −320° F.	Babcock and Wilcox Tube Co.
Pipe Gage	2¾" x 4½"	Steel	So calibrated that it registers pipe or conduit size when placed against it		⅛"-12" diameter pipe or conduit	Three-Point Gage Co.
D. NOZZLES						
Spray Nozzle	¼", ½", ¾" and 1" pipe size. 0.15-24 gpm.		Male and female thread with both hollow cone and full cone spray			Delavan Eng'r. Co.
Spray Nozzle		Brass and stainless steel	Hollow cone wall-mounted nozzle	Spraying water, oil, solvents or other materials with a similar viscosity	P. = 10-1000 lbs. per sq. in.	Spraying Systems Co.
E. VALVES						
Air Reducing Valve	½"-4" dia.	Main valve = stainless steel. Controlling valve = bronze	Stable under all flow conditions with instant reaction to pressure changes		Max. P. = 400 psi., to be reduced to 5-300 psi.	Leslie Co.
Air Relief Valve	2", 3", 4", 6", 8", 10" and 12" diameters		Gases to be vented forced up riser. Variation of liquid level in riser changes float level which opens release port for venting			Johnston and Jennings Co.
Angle Valve (No. 331)	½"-6" dia.	Aloyco-20, 18-8-S, 18-8-SM6 and other alloys on special orders	Retained bonnet gasket within the bolt circle, full floating modified plug type discs, seats integral with bodies. Flanged ends			Alloy Steel Products Co.

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PIPE AND FITTINGS—New Equipment Announced 1945-6. (*Continued*)

Type of Equipment	*Sizes*	*Construction Materials*	*Distinguishing Features*	*Applications and Limitations*		*Company*
Air Operating Valve	½" dia.		Valve operates instantly with either a vertical or horizontal pull		P. = Up to 200 psi.	Leslie Co.
Check Valve	180°, 105° or 90° bodies	Cast bronze, steel, semi-steel, cast iron and other alloys	Swing flap type check valve for protection against backsurge of discharge lines			J. A. Zurn Mfg. Co.
Check Valve			Synthetic rubber tube stretched over slotted metal core which expands to open and closes to contract	Handling highly corrosive and erosive gas or liquids		Grove Regulator Co.
Diaphragm Valve	4"-12" dia.	Cast iron with various linings such as lead, glass, rubber, etc.	Application of air control to Saunders Patent diaphragm valve	Remote control of corrosive and erosive liquids, gases and sludges	Max. P. = 150 psi. Max. T. = 180° F., st'd. or 220° F. for special	Hills-McCanna Co.
Gate Valve (No. 2111)	Up to 4"—no 1¼"	Aloyco 20, 18-8-S, 18-8-SMo and others on special order	Round bonnet flange with retained gasket. Double disc, ball and socket type wedge for perfect seating. Raised faces on end flange	Services requiring working pressures of 125-300 lbs. per sq. in.		Alloy Steel Products Co.
Globe Valve (No. 2311)	¼"-4"—no 1¼"	Aloyco-20, 18-8-S, 18-8-SMo and others on special order	Round bonnet flange with retained gasket. Full floating modified plug on type disc. Raised faces on flanges	Services requiring working pressures of 125-300 lbs. per sq. in.		Alloy Steel Products Co.
Globe Valve (No. 310)	½"-3" dia.	Aloyco-20, 18-8-S, 18-8-SMo and others on special order	Retained bonnet gasket within the bolt circle, minimum of four bonnet bolts and full floating modified plug type discs, seats integral with body. Screwed ends			Alloy Steel Products Co.
Globe Valve (No. 311)	¼"-6" dia.	Aloyco-20, 18-8 S, 18-8-SMo and others on special order	Retained bonnet gasket within the bolt circle, minimum of four bonnet bolts and full floating modified plug type discs, seats integral with body.			Alloy Steel Products Co.
Hydraulic Relief Valve	½"-1½" dia.	Bronze, steel, monel or stainless steel body. Stainless steel trim	Primarily for super pressures (up to 15,000 psi.) through throat bushing, self-stabilizing disc. Not for gas or vapor service			J. E. Lonergan Co.
Internal Tank Valve (V-104)	4", 6", 8" and 10" dia.	Bronze or stainless steel trim and steel bodies	Valve to guard contents of liquid storage tanks against "run-off," if line breaks, by manual or automatic cutoff. The latter is operated by a fusible plug			Johnston and Jennings Co.
Nozzle Relief Valve	1½"-6" dia. (St'd. orifice sizes)	Iron body, bronze or stainless steel trim; steel or alloy steel body with stainless steel trim	Independent blow-down control and automatically variable baffling giving exceptional consistency of performance. Coefficient of flow = 0.975	Pressure safety protection on process equipment to 2000 psi. and 1000° F.		J. E. Lonergan Co.
Pressure Reducing Regulator	⅛" and ¼" pipe size		Valve so constructed to give positive dead end shutoff	Pressure reduction of gases or liquids	Max. initial P = 5000 psi. with control range = 5-1500 psi.	Grove Regulator Co
Pressure Relief Valve	2"x3", 3"x4", 4"x6", and 6"x8"	Iron or steel bodies with bronze or stainless steel trim	Nozzle is extra long bringing valve seat above discharge area—low friction loss. Beveled seating surface assures tight seat	Safety valve for vapors and gases and relief valve for liquids		Johnston and Jennings Co.
Pressure Seal Valves		Stellite faced body rings	Pressure seal bonnet joint using internal pressure to seal joint. Lowered weight on new type with welding ends, embracing gate, globe and angle, and automatic stopcheck valves			Crane Co.
Pressure-Vacuum Vent Valve	2"-24" dia.	Cast or galvanized iron, or stainless body. Cast iron cover	Easily replaceable gasket, secured by snap ring. Full nozzle flow on pressure, generous vacuum capacity	Atmospheric storage tanks for petroleum products, solvents, etc.	All sizes open at ½" or 1" vacuum. Max. P. = 4-16 oz.	Black, Sivalls and Bryson, Inc.
Relief Valve	½"-2" dia.	All stainless steel	Forged Type 304 18-8 stainless steel body and stainless steel mechanism in both vapor and hydraulic types	Pressure safety protection on process equipment under corrosive conditions at 2000 psi. and 1000° F.		J. E. Lonergan Co.
Safety Head	½" rupture member and ¼", ⅜" or ½" connections	Brass body. Rupture disc of Al or Ag with corrosion-resisting coating	A low-priced, "throw-away" midget rupture disc unit. Disc installed, sealed and tested at the factory	Protection of refrigerating systems, hot water tanks and small air tanks	Max. P. = Al disc 150-500 psi.; Ag disc 250-500 psi.	Black, Sivalls and Bryson, Inc.
Sampling Valve (No. 730 and 731)	½" only	Aloyco 20, 18-8-S and 18-8-SMo	Union bonnet for easy disassembly, full floating modified plug type disc insures perfect closure without galling	Sampling solutions in flow lines		Alloy Steel Products Co.
Solenoid Valve	1-3"	Body is cast iron or bronze with valve seat and stem of stainless steel	Globe screwed direct-acting valve. Single seat construction eliminates trouble with silt freezing the piston	All types of liquid level control	Max. P. = 150 psi.	Johnson Corp.
Three-Way Valve	⅛"-¼" I.P.S.	Synthetic rubber tube in a Bakelite body	Manual operation permits opening and closing of ports at each ½ turn of the handwheel which is self-locking	Corrosive or erosive liquids or gases	Max. P. = 250 psi. Max. T. = 150° F.	Grove Regulator Co.
V—Port Valve (No. 423)	½"-4" dia. no 1¼"	Aloyco-20	Retained bonnet gasket, indicator plate for fluid control, disc pinned to stem to prevent rotation when throttling	Throttling and meter service		Alloy Steel Products Co.
Y—Valve (No. 361)	1", 1½", 2", 2½" and 3"	Aloyco-20, 18-8-S, 18-8SM0, and other alloys on special order	Retained bonnet gasket within bolt circle, minimum of four bonnet bolts and ball type disc			Alloy Steel Products Co.
E. MISCELLANEOUS						
Flanged Type Conical End Fittings	1", 1½", 2", 2½", 3", and 4" dia.	Stainless steel (Type 316), 16-, 15- and 14-gauge	Low cost, light gauge and light weight stainless steel tubing. No internal flow obstructions	Handling corrosive products		Tri-Clover Machinery Co.
Gasket Replacement Tool		Steel forgings	Flange-Jacks open flanges up to a load of 15 tons evenly and smoothly for gasket replacement			T. G. Persson Co.
Pipe Seals	⅛", ¼", ⅜", ½", ¾", and 1" dia.	Plastic	seals for end of pipe with square or countersunk end			American Molded Products Co.
Steam Traps	½"-1¼" dia.	Semi-steel	Patented high capacity venturi orifice permitting maximum flow		Max. P. = 250 psi. Max. T. = 400° F.	Strong, Carlisle and Hammond Co.
Welding Pipe Fittings	1"-14" dia.	18-8-Mo.	Socket welding fitting to eliminate flanges and bolts			Electric Steel Foundry
Welding Fittings	1", 1½", 2", 2½", 3", 4", 5", 6", 8", 10" dia.	Type 316 stainless steel	Light gauge stainless steel fabrication with no internal obstruction	Where corrosion resistance is required		Tri-Clover Machinery Co.

CENTRIFUGES—New Equipment Announced 1945-6

Type of Equipment	Sizes	Construction Materials	Distinguishing Features	Company
Centrifuges, Continuous	½-6 tons per hour		Screen type unit for handling any coarse or granular material. Coke removed from screen continuously by internal screw conveyor	Centrifuge Mechanical Equipment, Inc.
Demulsifiers, Continuous	4-33 bbls. per hour	All wearing surfaces, stellited	Fully automatic operation of centrifugal demulsifier	Centrifuge Mechanical Equipment, Inc.

INSTRUMENTATION AND PROCESS CONTROL—New Equipment Announced 1945-6

Type of Equipment	Sizes	Distinguishing Features	Applications	Limitations	Company
Auxiliary Mercury Switch	Single-Pole, Single-Throw or Single-Pole Double-Throw Hg Switch	Switch actuating cam is operated directly from pen positioning mechanism, assuring instantaneous control action at switch set points	Safety signalling for low and/or high T limits and on-off actuation of motorized and solenoid valves, timers, etc.		Brown Instrument Co.
Bellows Differential Flowmeter	12″ chart size	Sealed linkage between moving element and pen. Pen arm requires no mercury	Flow measurement where mercury is objectionable	Not recommended for highly pulsating flows	Bristol Co.
Bimetallic Dial Thermometer	2″, 3″ and 6″ dial	Calibrated bimetallic helical coil whose expansion rotates an indicating pointer over the scale		Limits = —90° F. and 1000° F.	Equipoise Controls
Bin and Tank Level Indicator		Suitable for liquid level on oils and non-conductive materials. Operates through change of capacity. No current flows through probe allowing use with many dry materials		Not suitable for conditions where volume is not steady	Mosher Electronic Controls
Bromine Comparator		Plastic comparator for colorimetric determination of bromine in water in swimming pools and municipal water supplies			W. A. Taylor and Co.
Capillary Pen for Recording Instruments		Low pen friction and smooth action make it valuable for instruments with a low actuating force	Recording of 3 process variables such as 3 temperatures, etc.		Brown Instrument Co.
Chromate Comparator		Plastic comparator for determination of chromates in refrigerating brines, etc.			W. A. Taylor and Co.
Conductivity Cell	Connector with liquid is ⅝″ Saran or metal tube	Positive-flow type of cell consisting of a tubular glass conductivity cell with concentric cylindrical Pt electrodes, and a continuous duty stainless steel pump	Useful for making measurements under rapidly changing concentrations		Industrial Instruments, Inc.
Continuous Dewpoint Recorder		Test gas contacts a metal mirror which is heated or cooled until dew forms on mirror. Photoelectric eye and mirror temperature recorded		T. tolerance = 2°	General Electric Co.
Counter	2-decade counter	Electronic counter counts up to 100 and a tube operated relay operates an electro-mechanical counter for the number of multiples of 100	Useful for rates which are too fast for conventional counters	Max. counting rate = 20,000 per sec.	Potter Instrument Co.
Current Input Controller	12″ chart size	Provides on-and-off type control with advantages of proportioning control. A rotating cam interrupts the flow of current, the duration of which is determined by departure of the controlled T from the control point	Control of electric furnace temperatures		Bristol Co.
Dew Point Indicator	Two ranges. —20° F. room T and —100°F. or 0° F.	Gas sample under pressure and further pressure produces visible condensation in indicator. Dew Point determined from P and T readings			Illinois Testing Laboratories, Inc.
Dew Point Temperature Recorder	—70° to 60° F.	Uses principle of dew point cup and its operation is independent of gases making up atmosphere	Furnace and oven atmospheres; solvent recovery systems		Surface Combustion Corp.
Electronic Potentiometer Pyrometer		Indicating recording and controlling temperatures by electronic means—no moving parts	T measurement by thermocouples	Range = 0-3000° F. fixed thermocouple, higher by radiation	Bailey Meter Co.
Feed Control		Dust-tight machine for feeding hammer mills, attrition mills and cutters		Not suitable for ball or rod mills	Mosher Electronic Controls
Flow Gage		Magnetic flow gauge in which flow-actuated movement of a magnetic cylinder in the center of the tube moves the indicator hands, the extent of the movement being dependent on the rate of flow			Ohio Pattern Works and Foundry Co.
Flow Meter		Steel-enclosed gauge without a stuffing box, requiring no mercury or auxiliary power	Rate of flow indicated within 2%		Builders-Providence, Inc.
Frequency Meter and Tachometer		Measures speed of rotating or reciprocal mechanisms by means of a "photo-beam converter." Measures speeds in excess of 1,000,000 rpm. or cpm. 0.1-0.2% = accuracy which is substantially unaffected by line-voltage variations			Communications Measurements Laboratory
Gas Analyzer		Continuously records and indicates one component of mixed gases by the thermal conductivity principle. A reference gas is used	Detecting impurities in hydrogen, carbon dioxide, etc.		General Electric Co.
Gas Detector		Thermal conductivity cell for gas detection and analysis			Davis Emergency Equipment Co.
Halogenated Hydrocarbon Analyzer	1, 4, or 6 point analyzer	Halogenated hydrocarbon passed through a quartz tube at 800° C. to produce a hydrogen halide which is continuously absorbed in a measured stream of distilled water and measured via electrical conductivity	Protection from excessive concentrations of halogenated hydrocarbons		Industrial Instruments, Inc.
Heating Controller	12″ chart size	Automatic changeover from low to high temperature firing of gas or oil fired two-stage burners	Heat treating		Bristol Co.
Humidity Recording and Control		Holds humidity below a constant "safe" level of 30% for storage of metallic materials without corrosion. In operation human hairs are stretched between holders, their length varying with the humidity			Friez Division, Bendix Aviation Corp.
Immersion Pyrometer	4¾″ indicator. 0-2500° F.	Interchangeable thermocouples, both open and protected types			Pyrometer Instrument Co.
Index Setting Device for Secondary Pneumatic Controllers		Permits wide range of calibrated adjustments for change of index movement with change in air pressure	Useful for "averaging liquid level" control		Brown Instrument Co.
Indicating Flow Meter		Remote indicating flow meter which measures, indicates and totalizes liquid flow rates. No external source of electricity required			Hays Corp.
Leak Detector		Mass spectrometer applied to location of small leaks in vacuum systems. Helium jet used as probe locates leaks by analysis for helium in the contents of the vessel with a mass spectrometer		Concentrations of 1 part of helium in 200,000 parts air can be determined	General Electric Co. and Westinghouse Electric Corp.
Megohm Meter (Model 1500)	Range of 400,000 ohms to 100,000 megohms	Accurate despite line voltage fluctuations to 3% mid-scale and 5% at all points			Communication Measurements Laboratory
Mercury Switch Pyrometer Controller		One to four single pole single throw Hg switches provide control action and when combined with continuous balance temperature measurement give much closer process control		Contact rating = 1 amp. DC or AC on 115 volt non-inductive load	Brown Instrument Co.

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INSTRUMENTATION AND PROCESS CONTROL—New Equipment Announced 1945-6. (*Continued*)

Type of Equipment	*Sizes*	*Distinguishing Features*	*Applications*	*Limitations*	*Company*
Metal Detector	43" x 15" x 32"	Reaction on high frequency magnetic field of metal particle causes a light to show or ejection of material after amplification. Can be adjusted to react to various sizes of particles		Any metal particle	RCA Victor Division Radio Corp. of America
Meter Body		Mercury seal provided between electrical transmitter, used in measuring flow, etc., and fluid being measured		For gassing liquids, and handling high viscosity or corrosive liquids	Brown Instrument Co.
Moisture Register		Operates on principle of power absorption from a high-frequency oscillator circuit. Time for reading = about three seconds	Testing moisture in cloth, lumber, etc.		Moisture Register Co.
Nitrate Comparator		Plastic comparator for colorimetric determination of nitrates in boiler water			W. A. Taylor and Co.
Oxygen Recorder		Continuous high speed analysis aids in indicating, recording and controlling oxygen concentration in combustion and control of atmospheres		Range = 5-25% oxygen	Bailey Meter Co.
Phosphate Comparator		Plastic comparator for determination of hexameto, pyro, septa, and other phosphates in 20 minutes instead of several nours	Power plants, hot water systems, laundries, etc.		W. A. Taylor and Co.
pH Meter		Compact, line-operating, continuous indicating and direct reading instrument			Macbeth Corp.
Pneumatic Transmitter	1 gpm. of liquid or 4 cfm. air up	Flow is measured with rotameter translating flow rate into proportional air pressure to actuate remote indicating, recording or controlling instruments	For locations subject to explosion hazards or where power is unavailable		Fischer and Porter Co.
Polarograph	4½ seconds = full scale open speed	Use of dropping mercury electrode for analysis, eliminating photographic development of polarograms with visible current-voltage curves	Analysis of alloys, paints, oils and various organic materials		E. H. Sargent Co.
Portable Pyromete		Hand pyrometer giving a direct T reading on scale		Up to 1200° F.	Roller-Smith Co.
Pressure Gage	4½"-12" dia.	Bourdon tubes of phosphor-bronze, tool steel, stainless steel, K-monel, Inconel or Hastelloy-B. 15-30% greater effective tube length and calibrated to nearly the accuracy of the test gage			J. E. Lonergan Co.
Pressure Gage and Control		New type pressure gage using electrical resistance strain gage where changes in resistance due to conductor deformation by pressure is utilized to real changes in pressure and for control		Ranges up to 0-20,000 psi.	Southwark Division Baldwin Locomotive Works
Pressure Pulsation Damping Unit	7/16" x 1 1/16" with P rating of 1500 psi.	Steel external sheet with 18-8 (Type 304) internal parts to give a true mathematical average of pulsating pressure waves	In instruments measuring pressure or flow	Lower frequency limit = 1 cycle per sec.	Taylor Instrument Co.
Pressure—Time Indicator		Diaphragm is placed in pressure line which unbalances an electronic circuit with a pressure change. The unbalanced voltage is amplified and picked up on an oscillograph	Indicates P-time performance of motors, pumps, etc.	Max. P. = 10,000 psi.	Electro Products Laboratories
Purge Meter	3.5 cc.—0.9 gpm. water or 50 cc.—0.9 cfm.	Furnished with built-in control valve to give flow rate indication in purging service manometer lines and gas or liquid flow control			Fischer and Porter Co.
Pyrometer Controller		Multi-position electronic pyrometer controller			Wheelco Instruments Co.
Quantometer		Direct reading instrument for quantitative chemical analysis of as many as eleven elements in less than one minute via a spark type spectrometer			Harry W. Dietert Co
Recording—Controlling Hygrometer	8 ranges for relative humidity from 7-99%	Sensing element occupies only two sq. in. of space and is precise even at low humidities and low temperatures	Dehydration studies, water-vapor permeability tests, etc.		American Instrument Co.
Recording Pen		Bimetallic strip, which warps when part of the electric current to process equipment is shunted thru it, is linked to auxiliary recording pen to provide operational record on outer edge of chart	Records length of pumping, compressing and stoking operations		Brown Instrument Co.
Retort Controller	One standard size	After retort or vessel is loaded operator pushes button and controller takes over, heating, cooling, etc., when necessary	Processing foods		Portable Products Corp. C. J. Tagliabue Division
Rotameter		So designed that material only contacts some corrosion resistant material, such as Karbate, Haveg, Pyrex, porcelain, etc.			Schutte and Koerting Co.
Rotameter	⅛"-4" dia.	¼" safety glass windows shields workmen. Replaceable meter tube without removal from line, available in various corrosion resistant metallic and non-metallic materials		Max. P. = 600 psi.	Brooks Rotameter Co.
Rotameter	Down to 5 cc. per min.	Low flow rotameter with remote recording, indicating and recording feature	Pilot plant operation and small industrial units		Fischer and Porter Co.
Running Time Recorder	8" and 12" chart	Records time off and time on	Production control and study		Bristol Co.
Specific Gravity Indicator		An adaptation of a rotameter containing a hydrometer instead of a rotameter float			Schutte and Koerting Co.
Stroboscope	600-48,000 rpm.	Provides method of slow motion study of high-speed equipment. Portable			Communication Measurements Laboratory
Temperature Controller		Controls and records all steps of a process cycle according to predetermined schedule			Foxboro Co.
Temperature Regulator		Controls T by controlling steam pressure in heat exchanger		100° F. adjustable temperature range	Leslie Co.
Thermometer	Spans of 100° F. and 200° F. from —150° F. to 800° F.	Interchangeable bulb elements. Pneumatic "null" balance transmission system for over 1000 ft. No long capillary line		Max. T. = 800° F.	Moore Products Co.
Vacuum Gage		Knudsen type, consisting of an aluminum vane suspended from a fine tungsten wire along with a mirror which reflects light onto a scale. Movement is produced by positioning heaters so that heated molecules strike vane and cause rotation, the amount of which is a measurement of the vacuum present		P. range = 1×10^{-3} microns to 5×10^{-5} microns. Hg	Distillation Products, Inc.
Vacuum Gage	4 1/16" long x 1 1/16" max. bulb dia.	Measures vacuum by means of a thermocouple element measuring variations in thermal conductivity of gases		±5% accuracy at P. of 10^{-1} to 10^{-5} mm. Hg.	Sylvania Electric Products Co.
Vacuum Gage		Linear pressure measurement for any atmosphere in the 0-10 mm. range by the ionization principle			National Research Corp.
Vacuum Gage		Ionization type gage for pressures down to 10^{-7} mm. Hg.			General Electric Co.
Vacuum Gage		Sealed glass measuring chamber for continuous measurement and recording of ultra vacuums		Range = 500-0.001 microns Hg.	George E. Fredericks Co.
Viscosimeter	50-1400 Saybolt second units	Continuous indicating, recording and control of viscosity	Lube oil blending and indicating end points in plastics processing	Max. = 1400 SSU.	Fischer and Porter Co.

COMPANIES WHOSE NEW EQUIPMENT IS DESCRIBED IN "PROCESS EQUIPMENT DEVELOPMENTS"

Allen-Bradley Co.
136 W. Greenfield Ave.
Milwaukee 4, Wis.

Allis-Chalmers Mfg. Co.
Milwaukee 1, Wis.

Alloy Steel Products Co.
Linden, N. J.

Alpha Metals, Inc.
369 Hudson Ave.
Brooklyn 1, N. Y.

American Air Filter Co.
125 Central Ave.
Louisville 8, Ky.

American Instrument Co.
8015 Georgia Ave.
Silver Spring, Md.

American Molded Products Co.
1644 N. Honore St.
Chicago 22, Ill.

American Optical Co.
Southbridge, Mass.

Automatic Transportation Co.
149 W. 87th St.
Chicago 20, Ill.

Babcock and Wilcox Tube Co.
85 Liberty St.
New York, N. Y.

Bailey Meter Co.
Cleveland 10, Ohio

Baker-Raulang Co.
2168 W. 25th St.
Cleveland 13, Ohio

Baldwin Locomotive Works
Southwark Division
Chester, Pa.

Bart Mfg. Co.
Belleville, N. J.

Bar-Way Mfg. Co.
Stamford, Conn.

Bendix Aviation Corp.
Friez Division
Taylor Ave. at Loch Haven
Towson, Baltimore, Md.

Black, Sivalls and Bryson, Inc.
2410 Power and Light Bldg.
Kansas City, Mo.

Blackmer Pump Co.
1902 Century Ave.
Grand Rapids 9, Mich.

Blaw-Knox Co.
Sprinkler Division
Pittsburgh, Pa.

Bridgeport Brass Co.
Bridgeport, Conn.

Bristol Co.
Waterbury 91, Conn.

Brooks Rotameter Co.
Lansdale, Pa.

Brown Fintube Co.
110 Huron St.
Elyria, Ohio

Brown Instrument Co.
4494 Wayne Ave.
Philadelphia 44, Pa.

Buda Co.
Harvey, Ill.

Builders-Providence, Inc.
74 Codding St.
Providence, R. I.

Cardox Corp.
307 N. Michigan Ave.
Chicago 1, Ill.

Centrifugal Mechanical Equipment Inc.
95 River St.
Hoboken, N. J.

Chain-Belt Co.
1600 W. Bruce St.
Milwaukee 4, Wis.

Clark Bros. Co.
Olean, N. Y.

Clark Tructractor Co.
Battle Creek, Mich.

Cleveland Crane & Eng. Co.
1101 E. 283rd St.
Wickliffe, Ohio

Communications Measurement Laboratory
120 Greenwich St.
New York 6, N. Y.

Condenser Service & Engineering Co.
95 River St.
Hoboken, N. J.

Cornell Machine Co.
101 Park Ave.
New York 17, N. Y.

Corning Glass Wks.
Corning, N. Y.

Crane Co.
74 E. Ninth St.
Chicago, Ill.

Davis Emergency Equipment Co., Inc.
45 Halleck St.
Newark, N. J.

Delavan Engineering Co.
Des Moines, Iowa

Denver Equipment Co.
1400 Seventeenth St.
Denver, Colo.

Despatch Oven Co.
600 S. E. Ninth St.
Minneapolis 14, Minn.

Dietert Co., Harry W.
9330 Roselawn Ave.
Detroit 4, Mich.

Dings Magnetic Separator Co.
509 E. Smith St.
Milwaukee, Wis.

Distillation Products, Inc.
Rochester, N. Y.

Downingtown Iron Wks.
Downingtown, Pa.

Drinkwater, Inc.
1323 S. Michigan Ave.
Chicago 16, Ill.

Eco Engineering Co.
12 New York Ave.
Newark, N. J.

Electric Hotpack, Inc.
Cottman Ave. at Melrose St.
Philadelphia 35, Pa.

Electric Machinery Mfg. Co.
Minneapolis 13, Minn.

Electric Steel Foundry
2141 N. W. 25th Ave.
Portland, Ore.

Electro Products Laboratories
349 W. Randolph St.
Chicago 6, Ill.

Elwell-Parker Co.
Cleveland, Ohio

Equipoise Controls
342 Madison Ave.
New York 17, N. Y.

Fischer & Porter Co.
County Line Rd.
Hatboro, Pa.

Foxboro Co., The
Foxboro, Mass.

Fredericks Co., George E.
Philmont Rd. & Anne St.
Bethayres, Pa.

Gasflux Co.
Mansfield, Ohio

General Ceramics & Steatite Corp.
Keasbey, N. J.

General Detroit Corp.
2270 E. Jefferson Ave.
Detroit 7, Mich.

General Electric Co.
1 River Road
Schenectady 5, N. Y.

Girdler Corp.
Thermex Div.
Louisville, Ky.

Goetze Gasket & Packing Co.
New Brunswick, N. J.

Goodrich Co., B. F.
Akron, Ohio

Grove Regulator Co.
6507 65th St.
Oakland 8, Calif.

Gustin-Bacon Mfg. Co.
Kansas City, Mo.

Hays Corp.
Michigan City, Ind.

Hills-McCanna Co.
3025 N. Western Ave.
Chicago, Ill.

Hormann & Co., Inc., F. R.
186 Joralemon St.
Brooklyn, N. Y.

Huppert Co., K. H.
6830 Cottage Grove Ave.
Chicago 37, Ill.

Illinois Testing Laboratories, Inc.
420 N. La Salle St.
Chicago 10, Ill.

Industrial Instruments, Inc.
17 Pollock Ave.
Jersey City, N. J.

Jabsco Pump Co.
8306 Wilshire Blvd.
Beverly Hills, Calif.

Johnson Corp.
Three Rivers, Mich.

Johnston and Jennings Co.
898 Addison Rd.
Cleveland 14, Ohio

Lapp Insulator Co.
Process Equipment Div.
Leroy, N. Y.

Leslie Co.
69 Delafield Ave.
Lyndhurst, N. J.

Lewis-Shepard Products, Inc.
222 Walnut Ave.
Watertown 72, Mass.

Lift Trucks, Inc.
Station B
Cincinnati, Ohio

Link-Belt Co.
307 N. Michigan Ave.
Chicago, Ill.

Lonergan Co., J. E.
Second and Race Sts.
Philadelphia, Pa.

Macbeth Corp.
227 W. 17th St.
New York 11, N. Y.

Marco Co., Inc.
411 Monroe St.
Wilmington 17, Del.

Marion Electrical Instrument Co.
Manchester, N. H.

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Material Movement Industries
310 S. Michigan Ave.
Chicago 4, Ill.

McIntyre Co.
15 Riverdale Ave.
Newton 58, Mass.

Micro-Metallic Co.
99-16 Metropolitan Ave
Forest Hills, N. Y.

Mine Safety Appliances Co.
Braddock & Meade Sts
Pittsburgh 8, Pa

Moisture Register Co.
133 N. Garfield
Alhambra, Calif

Moore Co.
544 Westport Rd.
Kansas City 2, Mo

Moore Products Co.
H & Lycoming Sts.
Philadelphia 24, Pa.

Mosher Electronic Controls
130 W. 42nd St.
New York 18, N. Y.

National Carbon Co.
30 E. 42nd St.
New York 17, N. Y

National Radiator Co.
Johnstown, Pa.

National Research Corp.
100 Brookline Ave.
Boston 15, Mass.

Newark Wire Cloth Co.
361 Verona Ave.
Newark 4, N. J.

Niagara Blower Co.
6 E. 45th St.
New York 17, N. Y.

Northern Blower Co.
6409 Barberton Ave.
Cleveland 2, Ohio

Northrop-Gaines, Inc.
1985 E. 16th St.
Los Angeles, Calif.

Nunn Mfg. Co.
2125 Dewey Ave.
Evanston, Ill.

O'Brien Steam Specialty Co.
328 Heffernan Bldg.
Syracuse 2, N. Y.

Ohio Pattern Works & Foundry Co.
2935 Colerain Ave.
Cincinnati 25, Ohio

Palmer-Shile Co.
7131 W. Jefferson Ave.
Detroit 17, Mich.

Patterson Foundry & Machine Co.
East Liverpool, Ohio

Patterson-Kelly Co., Inc.
East Stroudsburg, Pa.

Perma-Line Rubber Products Co.
1840 N. Damen
Chicago 47, Ill.

Persson Co., T. G.
225 Glenwood Ave
Bloomfield, N. J.

Pfaudler Co., The
89 East Ave.
Rochester 4, N. Y.

Pioneer Rubber Co.
Willard, Ohio

Portable Products Corp.
Tagliabue Div., C. J.
565 Park Ave.
Brooklyn 5, N. Y.

Porter Co., H. K.
Pittsburgh 22, Pa.

Potter Instrument Co.
136-56 Roosevelt Ave.
Flushing, N. Y.

Pressurelube, Inc.
609 W. 134th St.
New York 31, N. Y

Pritchard & Co., J. F.
2200 Fidelity Bldg.
Kansas City, Mo.

Proctor & Swartz, Inc.
700 Tabor Rd.
Philadelphia 20, Pa

Products Research Corp.
634 S. Western Ave.
Los Angeles 5, Calif.

% Proportioneers, Inc. %
10 Codding St.
Providence 1, R. I.

Pulmosan Safety Equipment Corp.
176 Johnson St.
Brooklyn 1, N. Y.

Pulverizing Machinery Co.
85 Chatham Rd.
Summit, N. J.

Pyrometer Instrument Co.
95 Lafayette St.
New York 13, N. Y

Radio Corp. of America
RCA Victor Div.
Camden, N. J.

Radio Receptor Co., Inc.
251 W. 19th St.
New York, N. Y

Randolph Laboratories
8 E. Kinzie St.
Chicago 11, Ill.

Rapids-Standard Co.
308 Peoples National Bank Bldg.
Grand Rapids 2, Mich.

Raybestos-Manhattan, Inc.
Manhattan Rubber Div.
Passaic, N. J.

Rempe Co.
342 N. Sacramento Blvd.
Chicago 12, Ill.

Research Equipment Engineers
31 South St.
New York 4, N. Y.

Rockwell Co., W. S.
Gehnrich Oven Div.
50 Church St., New York 7, N.

Roller-Smith Co.
Bethlehem, Pa.

Roylyn Mechanical Laboratories
8928 Santa Monica Blvd.
Los Angeles 45, Calif.

Safety Clothing & Equipment Co.
7016 Euclid Ave.
Cleveland 3, Ohio

Sargent Co., E. H.
155-165 E. Superior St.
Chicago, Ill.

Schmidgall Mfg. Co.
309 Cass St.
Peoria 2, Ill.

Schneible Co., Claude B.
P. O. Box 502, Roosevelt Annex
Detroit 32, Mich.

Schutte & Koerting Co.
12th & Thompson Sts.
Philadelphia 22, Pa.

Scott Aviation Corp.
Lancaster, N. Y.

Seamlex Co., Inc.
27-27 Jackson Ave.
Long Island City, N. Y

Shell Development Co.
50 W. 50th St.
New York, N. Y

Simpson Co., Orville
1230 Knowlton Ave
Cincinnati 23, Ohio

Sparkler Mfg. Co.
Mundelein, Ill.

Speare's Sons Co., Alden
Cambridge, Mass.

Speedways Conveyors, Inc.
Main at Lisbon St
Buffalo, N. Y.

Spraying Systems Co.
4021-L W. Lake St.
Chicago 24, Ill.

Standard Conveyor Co.
North St. Paul 9, Minn.

Strong, Carlisle & Hammond Co.
1372 W. Third St.
Cleveland 13, Ohio

Surface Combustion Corp.
Grover & Sherman Sts.
Toledo, Ohio

Swenson Evaporator Co.
30 Church St.
New York, N. Y.

Sylvania Electric Products Co.
Boston 15, Mass.

Taylor Instrument Co.
P. O. Box 110
Rochester 1, N. Y

Taylor and Co., W. A.
7300 York Rd.
Baltimore 4, Md.

Techtmann Industries, Inc.
828 North Broadway
Milwaukee 2, Wis.

Thermoid Co.
Thermoid-Grizzly Wheel Sales Div
Chicago, Ill.

Three-Point Gage Co.
3767 N. Rosine Ave
Chicago 13, Ill

Towmotor Corp.
Cleveland, Ohio

Transicoil Corp.
114 Worth St.
New York, N. Y.

Trent Co., Harold E.
244 Leverington Ave
Philadelphia 33, Pa

Tri-Clover Machinery Co.
Kenosha, Wis.

United States Gasket Co.
602 N 10th St.
Camden, N. J.

United States Radium Corp.
535 Pearl St
New York 7, N. Y

United States Rubber Co.
1230 Sixth Ave.
New York, N. Y

Viking Pump Co.
Cedar Falls, Iowa

Warner Bros. Co.
Bridgeport, Conn

Warren Steam Pump Co., Inc.
Warren, Mass.

Westinghouse Electric Corp.
306 Fourth Ave., Box 1017
Pittsburgh 30, Pa.

Wheelco Instruments Co.
847 W. Harrison St.
Chicago, Ill.

Wiggins Oil Tool Co., E. B.
3424 E. Olympic Blvd.
Los Angeles 23, Calif.

Wind Turbine Co.
West Chester, Pa

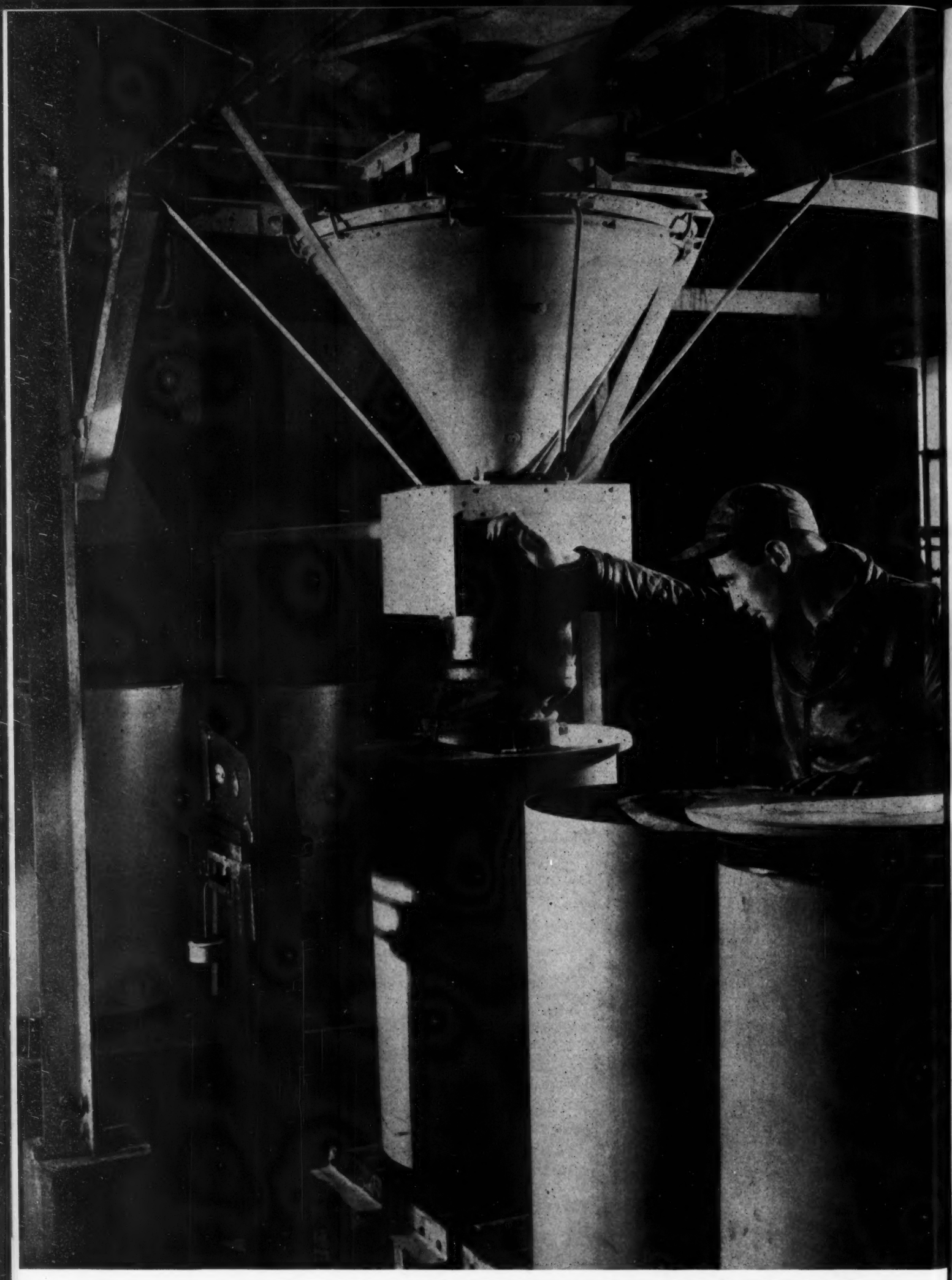
Wyssmont Co.
277 Broadway
New York 7, N. Y.

Yale & Towne Mfg. Co.
4530 Taconig St.
Philadelphia 24, Pa.

Yarco Distributors
215 W. Seventh St.
Los Angeles 14, Calif.

Yardeny Laboratories, Inc.
105 Chambers St.
New York, N. Y.

Zurn Mfg. Co., J. A.
Erie, Pa



Fiber drums gained wide recognition during the war for shipment of chemicals, both solid and semi-liquid. Their use increased threefold during the past few years.

Chemical Packaging More Efficient

THE BIGGEST news about containers is that there aren't enough of them. Chemical manufacturers are having the greatest difficulty in finding drums, boxes, cars—anything, in fact, in which to pack their products.

But shortages won't last forever, and soon the chemical industry will enjoy the benefits of research and development during the past few years within the containers and materials handling industries.

One manifest tendency is to custom-build the container to the needs of the product. Much is being done to provide a variety of containers of different sizes, strengths, materials of construction, types of closures, linings and coatings so that each chemical product may be most effectively packaged.

One of the permanent advances to emerge from the war was the use of palletization to expedite materials handling. This simple tool enabled materials to be stored more efficiently and at the same time cut labor as much as 90 per cent. Introduction of improved lift trucks and pallets was a natural result of this emphasis.

In this section are tabulated containers which, according to the manufacturers, have been introduced or improved during 1944-46. CHEMICAL INDUSTRIES has also asked experts on containers and materials handling to give us their views on developments in these fields.

NEW CONTAINERS

by T. PAT CALLAHAN,
Supervisor of Containers
Monsanto Chemical Company

IT IS VERY difficult to evaluate the advances which have been made during the past two years in containers and container fabrication, and place them in their respective positions so far as future use of these developments is concerned. The very unusual conditions occasioned mostly by shortages of materials have precluded the advances in container development which would have taken place were things in a more normal condition. However, improvements were made in existing packages, and we shall have to generalize some of these improvements.

It must be born in mind that the advances made during the past two years, with such upset conditions, will in no way compare with the advances which should be accomplished in the next two years if things return to anywhere near normalcy. Any advances during the past two years were born of the necessity of substituting one package for another. This was particularly true in the forward advances made by the fiber cannister, which, in a great many cases, replaced the metal can. All forms of dry and viscous materials formerly packaged in metal containers were packed in these fiber cannisters. We feel that this development will find a place in the container field for certain products, although many commodities will be returned to metal containers as soon as sufficient supplies become available.

To our mind, the most significant advances in containers and container fabrication have occurred in the development of the fiber carton and box and the multiwall paper bag. Of necessity, these containers have to be treated with various protective materials, and lend themselves very well to this application. The treatment of these materials not only enhances the value from a protective standpoint, but increases their safety from the standpoint of strength.

Various laminations of materials evoked developments of closures such as pressure sealing and wax dipping and made these types of containers very satisfactory for many chemicals which formerly could not be thus packaged.

Another significant advance in containers and container fabrication, so far as metal containers are concerned, has been the ability of the light drum, as a result of extreme shortages, to withstand many trips, carrying the material in a safe condition. A great amount of work is contemplated in order to determine the kind and type of metal container to be used for single trips in the future, as it may be possible to reduce the amount of metal in a container and still make it a satisfactory container for single-trip use.

During the war it was practically impossible to procure any kind of alloy drum. The manufacturers of alloy materials and the drum manufacturers embarked upon a program of development, and it is expected that a great many uses will be found in the chemical industry for alloy drums.

A most significant advancement in packaging was developed by the Manufacturing Chemists' Association when they developed the 6½-gallon glass carboy. This carboy has been authorized for certain mineral acids and some other materials. The big feature in conection with this is that the carboy is equipped with a screw cap and liner which automatically vents the material at elevated temperatures.

The fiber drum manufacturers were working on various coatings and linings to be used inside fiber drums, but this program was seriously curtailed when materials became short. These same suppliers have now increased their research, and it is most certain that many special types of fiber containers will be available.

If it were not for the serious shortage of fiber containers at the present time, we feel that a great many of these improvements would now be available for use in the chemical industy. As we stated above, a great amount of work was done and is still being done in the advancement of containers and container fabrication, and a better account of the outcome will

be forthcoming as soon as conditions within the industry return to a more normal state.

PALLETIZATION

by NORMAN L. CAHNERS, Director
Materials Handling Laboratories

DESPERATE pressure to "pass the ammunition" and other vital supplies to combat areas during the war resulted in enormous strides in materials handling efficiency.

Currently industry has an opportunity to take advantage of experience that would have taken years of normal industrial development to acquire. Companies manufacturing industrial trucks and other types of handling equipment, having done a valuable service for the government during the past five years, are now in a position to recommend their products in the light of an eminently successful record of solving handling problems involving every conceivable commodity under all kinds of operating conditions.

The chemical industry is in a particularly advantageous position to make the most of the expanded know-how of professional materials handling engineers and the many veterans seeking employment on the basis of their service experience in modern handling methods. Chemical products ranked high in the volume of materials handled and used by the armed forces. In addition, bags, fibreboard containers and drums used to package many types of chemicals were perhaps more frequently encountered than anything else in the over-all picture of moving war goods.

Palletization was particularly valuable in handling the great volume of materials packed in bags and fibreboard boxes. Frequently the high stacking made possible through pallets and unit load storage saved the day for activities hard-pressed for warehousing space. This was true because fork trucks can whisk a pallet carrying several thousand pounds up to the rafters in a matter of seconds, whereas the manual labor of stacking goods over shoulder height taxes human muscle power beyond the allowances of efficiency.

SPACE SAVING

Moreover, it was found that warehouses stowed with unit loads are far more flexible than those which depend on age-old methods of moving and stacking their contents. When industrial trucks are used, aisle space can be rearranged in a few minutes in order to expedite shipments or make room for new items. The space-consuming necessity of keeping certain types of commodities accessible by means of added aisles is eliminated because no matter how deeply any particular stow is buried behind other items, a fork truck can get at it readily.

Fibreboard containers and bagged goods were usually found to be among the easiest of the great number of objects for which load patterns had to be designed. Where operations called for intra-warehouse movement only, they were placed on a pallet in a brick-laid or similarly interlocked arrangement and handled without any other load binding. However, in the large scale shipping operations which the armed forces carried on via pallets, glue or steel strapping was used to give added stability to the loads and assure that they would arrive at their destination in perfect condition. Shipping was the field in which economies effected by the use of mechanized handling equipment were really spectacular. In many instances the arduous labor of loading trucks and freight cars was reduced by as much as 90%.

Currently the work of materials handling engineers and of the equipment industry in general is being devoted to research which will enable all civilian shippers to realize these important savings. Considerable progress in this direction has already been made by the development of expendable pallets which are cheap enough to be used as one-shot shippers. They afford the economies of mechanized handling at an initial cost which is absorbed in the first series of handling. Their appearance makes it possible for any consignee to demand that his vendors ship to him on pallets thereby relieving him of the costs of manual unloading of incoming shipments and enabling him to maintain the same high level of efficiency in all his operations.

PALLET STANDARDIZATION

Great strides have been made in some industries in standardizing on pallet sizes with the objective of furthering shipping efficiency for all the companies in that industry. In this respect, consideration is being given to a number of pallet sizes which will best meet the problems of all the shippers involved. One of the most widely used of these industry-wide standards is the 40″ x 48″ four-way pallet. This particular type has a very vital qualification responsible for its wide acceptance, namely; its flexibility in fitting into freight cars two abreast the 48″ way and into trucks two abreast the 40″ way. Being equally accessible in either direction the four-way pallet permits combined rail and highway shipment with minimum handling.

The fact that a fork or hand pallet truck can pick up a four-way pallet from any direction is a distinct advantage to equipment operators as well as to management. It facilitates the transfer of loads from one piece of equipment to another. It will frequently make reductions in aisle space possible by increasing the average accessibility of loads in a large block of stowage and it is practically indispensable in loading many types of carriers.

Bagged goods are exceptionally adaptable to unit load handling. To insure stable, secure unit loads, the bags should be laid in crosswise patterns on the pallets. A good way to prevent slippage is to interlock them on their narrow sides as shown in the diagram.

TRUCKS

In addition to the advances in pallet construction which have been made recently, equipment companies have done extremely well in bringing out fast, light, highly-maneuverable trucks which are performing wonders in loading freight cars and highway trailers. Reduced turning radius which enables these trucks to turn on a dime and slip into the most confined areas with little effort on the part of the operator is a goal for which designers have sought. Their present success means an important expansion in the application of modern handling techniques.

The appearance of new types of equipment, new methods of doing things and the application of established techniques to new fields is a cardinal indication of the vitality of the materials handling industry. In addition it signalizes the receptiveness of American business to sound, progressive aids to operating efficiency.

Materials handling engineers' keen efforts to be of service and executives' emphatic demand for top-flight materials efficiency in all phases of industrial operations adds up to a promise of the most important commercial progress since the advent of assembly lines and mass production. Headline stories of vivid interest to alert management are appearing in the materials handling trade press every day.

Material packaged in fibre board containers should also be palletized in interlocking patterns wherever tne dimensions of the boxes permit. If individual packages cannot be overlapped in alternate tiers, steel strap or glue is used to provide necessary stability.

CONTAINER SUPPLY

by T. PAT CALLAHAN

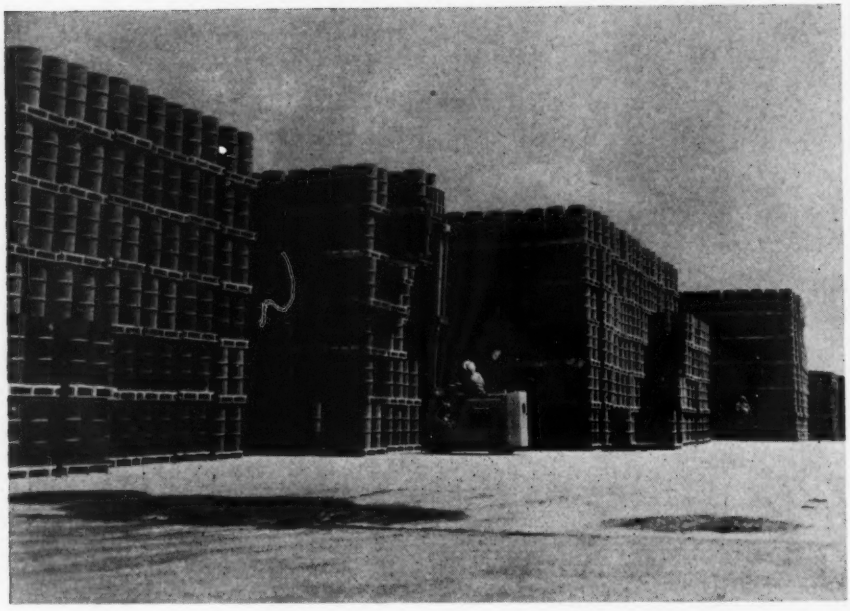
WITH SEVERE shortages in many lines of containers, an appraisal of the present and potential supply situation must be predicated upon what is presently happening and what will happen in the future to the materials which are used in the fabrication of containers. At the present time there is an extreme shortage of metal containers of all kinds. The wood situation is somewhat better but is nowhere near normal. Paper and fiber are somewhat easier to procure but in no sense are such containers available to the extent that they are needed by the chemical industry. Glass is not plentiful but can be procured.

In order to evaluate the potential supply situation for containers it is natural that such an appraisal can only be made if and when materials return to normalcy. The huge increase in packaging of chemicals, we feel sure, will delay the time when containers become readily accessible. Even at the present time, production in the chemical industry is increasing far beyond the ability of container suppliers to deliver necessary packages to take care of increased production.

War brought about many changes in packaging of chemicals and it only remains for future supplies to enable the chemical manufacturer to take advantage of these many changes. A specially treated fiber board which is less expensive than wood can be used with complete safety in the packaging of chemicals, and this will not only effect economy in the price of containers, but also in freight savings due to the lesser weight of the container. Many powders formerly shipped in rigid containers have been shipped in multi-wall paper bags, and there is every evidence that an upswing in the use of this package will be noticed in the future packaging of dry chemicals. Prior to the war a great amount of work had been done in the development of synthetic coatings for metal containers, and in a number of instances, these synthetic coatings proved very satisfactory. However, due to curtailments in most materials and changes in formulas, a lot of excellent work had to be abandoned. It is felt that a return to this program will prove very beneficial to the chemical industry, and that many metal containers will be resin coated.

One of the fundamentals which must be considered in the packaging of all chemical products is that the package shall be so constructed that it is not only a safe container, but also capable of protecting the product. Corrosion, moisture control, and contamination are three factors which must be considered in the

Loose solids, such as phthalic anhydride chips, lend themselves to packaging in paper bags. Here they are being filled at the new plant of the Standard Oil Co. of California.



Heavy, bulky items like steel drums are moved and stored with ease and economy by industrial trucks. Adjustable forks hooking under the ridges of the drums permit them to be lifted and placed on the pallets with no manual effort.

packaging and shipping of practically all chemical products. The chemical industry itself, working in conjunction with the container manufacturers, is progressing very favorably towards accomplishing the development of packages which are treated with its own products. For example, the application of resin to paper has increased the ability of fiber boxes and multi-wall paper bags to withstand hazards in packaging. Lamination by various methods and heat sealing have increased the moisture resistance of packages to a large degree, and this will contribute in a large measure to the control of moisture for products where it is essential.

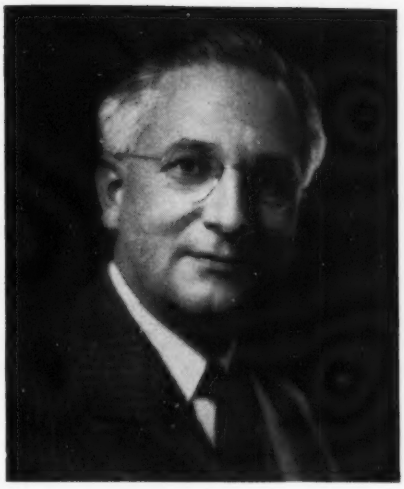
The treatment of wood and metal by various methods will make them impervious to certain chemicals in cases where they could not be used if they were not so treated.

In any appraisal of packages for the future, the work being done by the chemical industry itself in conjunction with the fabricators of containers will play a very important part.

NEW CONTAINERS—New Equipment Announced 1945-6

Type of Container	*Material of Construction*	*Capacities*	*Tare Weights*	*Lining*	*Closure*	*ICC Spec. No.*	*Remarks*	*Company*
Bags	Multi-wall paper				Valve and open-mouth		Manufactured to consumer's specifications, depending on material to be packed and type of protection necessary	Raymond Bag Co., Middletown, Ohio
Cans	Fiber body, metal ends	1⅓-1000 cu. in.		Parchment, paraffine, glassine and others resist moisture and hold liquid or oil products	Friction and slip covers; also swivel and dispensing tops			The Canister Co., Inc., Phillipsburg, N. J.
Caps, Bottle	Compression-molded plastic	8-33 mm.						Wheeling Stamping Co., Wheeling, W. Va.
Cartons	Laminated aluminum							Reynolds Metals Co., Richmond, Va.
Drums	All-fiber	3-57 gal.	2-25 lbs.		Fiber slip-over top	21A	Inside finishes according to requirements of commodities packed. Pres-to-form trade name	Emery-Carpenter Container Co., Cincinnati, Ohio
Drums	All-fiber	3-57 gal.	2-25 lbs.		Wood top with metal rim	21A	Designed for loads up to 400 lbs.	
Drums	All-rubber	13 gal.	35 lbs.	Neoprene, thicker than previously	Wired rubber stopper	43A	Used principally for HF up to 60%. Insures freedom from iron	Maurice A. Knight Co., Akron, Ohio
Drums, Light Shipping	Steel	10, 15, 30, 55 gal.		Baked lacquer available		17E, C	Also in Rule 40 C.F.C.	Rheem Mfg. Co., New York, N. Y.
Drums, Light Shipping	Steel	15, 30, 55 gal.			9", 12", 15" bolted covers		Quik-Lox	
Drums, Removable Head	Steel	15, 30, 55, 58 gal.		Baked lacquer available	Lever-type closing ring			
Drums, Removable Head	Steel	15, 30, 55 gal.		Baked lacquer available	Bolt-type closing ring.	17E*	*Applies only to 55-gal. size	
Drums, Grease	Steel	14½ gal. (100 lbs.)			18½" lug-type crimp, 9" lug-type crimp, 9" bolted or fall removable cover			
Drums, Single-Trip	Steel	18½-55 gal.			Friction cover, friction cover with cleats, reversed friction cover, bolt-type closing ring on pull removable head	37D, E, F, G*	*Many of the various sizes of the various types can be made to these specifications	
Drums, Returnable	Steel	55 gal.			Can be furnished with all standard types	5, 5A, B	Heads and bottom double-sealed to body. All above steel drums can be furnished hot-dip galvanized or tinned	
Envelopes	Aluminum foil							Reynolds Metals Co. Richmond, Va.
Kegs and Barrels	Red oak, white oak, gum	½-60 gal.	4-75 lbs.	Sodium silicate, paraffin	Wood bungs	10A, B, C		Pioneer Cooperage Co., St. Louis, Mo.
Tanks, Shipping	Steel	2000 lb.	1550 lb.			106A500	All forge welded	Columbiana Boiler Co., Columbiana, Ohio
Tanks, Shipping	Steel	2000 lb.	1550 lb.			106A500X	Fusion welded shell	
Tanks, Storage	Steel	All					ASME U-68, U-69, U70	

HEADLINERS in the NEWS



WILLARD H. DOW, president of Dow Chemical Co., awarded the Chemical Industry Medal for 1946. Dr. Dow was cited for "conspicuous service to applied chemistry."

ROBERT M. EVANS, formerly manager of the division handling Du Pont's atomic energy activities, named assistant manager of the company's industrial plastics department

JAMES L. ROGERS, president, Pitman-Moore Co., Indianapolis, elected president of the American Pharmaceutical Manufacturers' Association at its Lake Louise meeting.

WILLIAM F. TULEY, appointed operations manager, synthetic rubber division, U. S. Rubber Co. He formerly held the post of assistant sales manager, Naugatuck Chemicals.

ARTHUR W. CARPENTER, manager of testing laboratories, The B. F. Goodrich Co., elected president of the American Society for Testing Materials, at its recent meeting.

WALDO C. HOVEY, named vice-president, research and development, Harshaw Chemical Co. A McGill graduate, Mr. Hovey was previously an executive with Wyeth, Inc.

JOHN D. FERRY, assistant professor of chemistry, University of Wisconsin, who has been awarded the $1000 Eli Lilly & Co. prize for outstanding achievement in biochemistry.

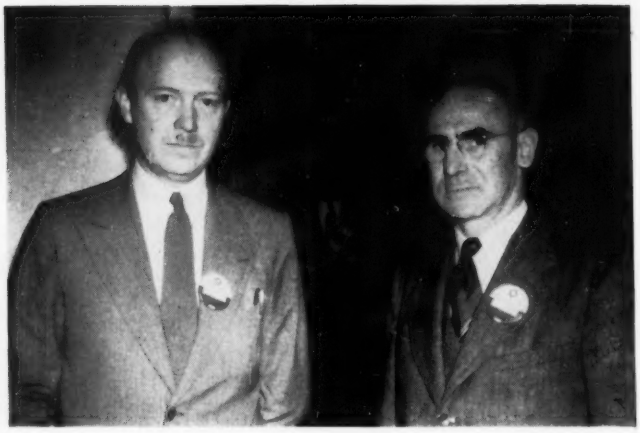
ROBERT E. WILSON, Standard Oil Co. (Indiana), and former Perkin Medalist, elected a life member in the Corporation of Massachusetts Institute of Technology.

Canadian Chemical Conference

New attendance records were established by the Chemical Institute of Canada at its annual conference held in Toronto June 24-26, when nearly 1100 Canadian and U. S. chemical men convened to discuss and appraise recent developments. Particularly evident was the dynamic character of the Institute, which, founded only two years ago, now has a membership of 3100 technical men.

The conference included technical sessions, a symposium highlighting research and wartime progress in industry, and a chemical exhibition in which 45 companies participated. Featured speakers included two provincial premiers—Hon. Stuart Garson, Manitoba, and Col. George E. Drew, Ontario.

At right are pictured R. R. McLaughlin, University of Toronto, retiring president (left), and C. A. H. Wright, Consolidated Mining and Smelting Co., new president.



Left to right: E. H. Land, Polaroid Corp.; E. C. Williams, Schenley Distillers; R. K. Larmour, University of Saskatchewan; W. S. Richardson, Goodrich Chemical; Norman S. Grace, Dunlop Rubber; G. W. Govier, University of Saskatchewan, and K. A. Glendenning, National Research Council. They discussed research-management problems and engineering advances.

Charles M. Skinner, Sherwin-Williams Co. (Canada) and Ludd Firing, Canadian Titanium Pigments, led protective coatings sessions.

C. B. Purves, McGill University, and George F. Wright, University of Toronto, discussed advances in the field of pure chemistry.

G. T. Page, general manager of the C. I. C, Mrs. Page, and W. F. Prescott, Montreal, at the annual president's reception.

H. McLeod, recently named chief, Chemicals Division, Bureau of Statistics, and E. T. Sterne, former Chemicals Controller.

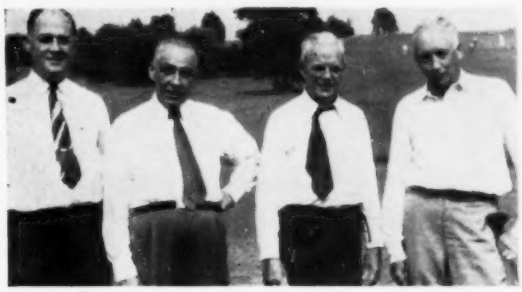
W. E. Pomeroy, Imperial Varnish Co.; V. G. Bartram, Shawinigan Chemicals, and Col. George E. Drew, Premier of Ontario.

T. W. Smith, Canadian Industries, Ltd., and Sheldon Sneyd, Harrisons & Crosfield. Mr. Sneyd was conference committee chairman.

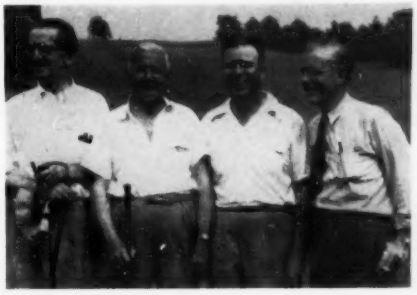
Chemists Display Golf Prowess

Some eighty members of the Chemists' Club forsook sweltering New York on July 9 to journey to the Hudson River Country Club, Yonkers, for the Club's annual golf tournament Par was not universally shattered, but a cool, enjoyable day was spent by both the active golfers, and those who favored the conviviality of the nineteenth hole.

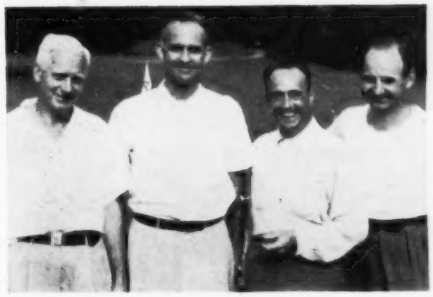
The low gross prize went to H. R. Wemple with a neat 81, with C. C. Stewart runner-up with an 83. O. R. Brunkow, and W. B. Reinhart turned in low nets of 65 and 69. Prizes for nearest the pin on the eighteenth hole were awarded to R. S. Bacon, and J. H. Nesbitt.

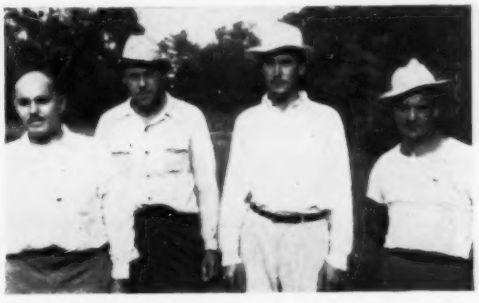


Left to right: H. B. Sliger Commercial Solvents; G. H. Kinsey, Baker Bro.; F. Smith, Merck; E. B. Curtis, Vanderbilt Co.; Joe Madden and J. P. Jones, Stauffer Chemical; Bill Hough, Johns-Manville; C. de Dampiere, Stauffer Chemical; E. L. Beals, Burroughs-Wellcome; D. B. Hand, Sheffield Farms; H. S Cottrell, Innis-Speiden; and H. Van Bomel, Sheffield Farms.

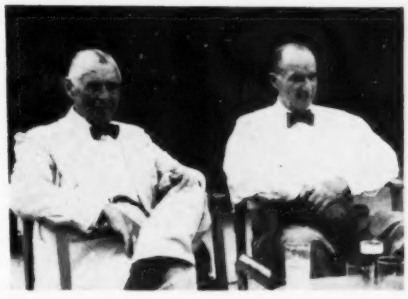


Left to right: Harry Mabey, Mathieson Alkali; "Doc" Dorland, Dow; Rupert Low, Bakelite; Wm. Weed, H. J. Mowry, and Jas. Ferris, Niagara Alkali; John Eldridge, Virginia Smelting; C. F. Judd, Scarburgh Co.; E. T. Booth, M. Lemmermeyer, J. Stephenson, Aromatic Products, and Jan Berlage, Jan Berlage, Inc. All had an eye on the "close-to-the-pin" prize.





C. W. Frost, Prior Chemical, D. G. Hood, Diamond Alkali; C. C. Stewart, C. C. S. Co.; Pete Reilly, Reilly Tar; J. W. Atherton, Atherton & Currier; Wm. D. Neuberg, R. F. Dixon, W. D. Neuberg Co.; C. Weedon, Scott & Bowne; W. Richardson, Airco; R. B. Boyd, Oldbury; Bob Hart, Airco, and F. H. Berggren, Oldbury. Mr. Frost was chairman in charge of tournament arrangements.



R. H. De Greeff, (right) R. W. Greeff & Co. relaxes with William Callan, Crawford Callan Co., at the club house.

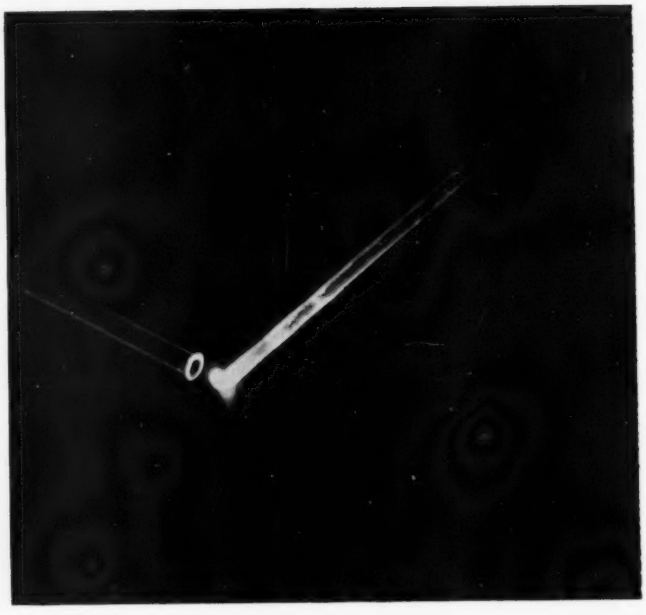
D. H. Killeffer (right) and C. P. Pollard, Hammond, Littell Co. at the "nineteenth," debate "birdies" and "eagles".

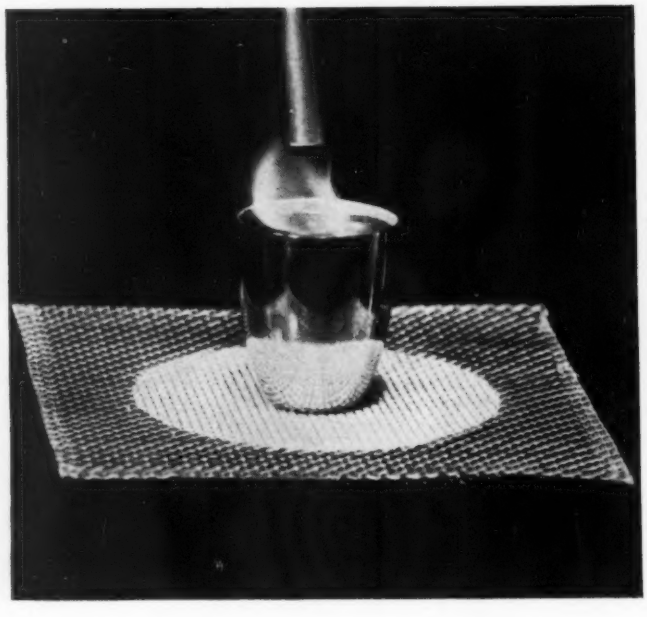
John M. Weiss (right), J. M. Weiss & Co., chats with Bolivian visitor R. M. Vargas, in the post-golf period.

Fluorine Harnessed

Although fluorine ranks twentieth in abundance among the elements found in the earth's crust, and its naturally occurring compounds have been widely used, the gas itself has long defied isolation and industrial exploitation. However, in recent years, the field of fluorine chemistry has attracted much attention, particularly in connection with the Manhattan Project, and this month Pennsylvania Salt Manufacturing Co. made the highly reactive gas available in experimental quantities.

Pictured (above) John F. Gall, Pennsalt technologist, checks the loading of half-pound fluorine cylinders, shielded by a sheet steel barrier. The window is two inch, bullet-proof glass, protected against corrosion by a plastic surfacing. At right, a glass rod "burns" in a jet of fluorine—by the reaction of the element with its silica content—and below (right) a steel rod goes up in smoke in a fluorine atmosphere. At left (below), water burns as its hydrogen and oxygen combine with the reactive element.

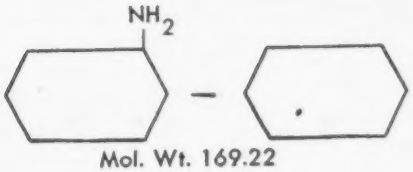




AN INTERMEDIATE
in dyestuff synthesis

ortho-Aminobiphenyl, Technical

(also known as 2-aminobiphenyl, ortho-aminodiphenyl, and 2-aminodiphenyl)



Mol. Wt. 169.22

STANDARD FORM: Cast Solid

SPECIFICATIONS:

Purplish crystalline mass	
Crystallizing point	47.0°C. min.
Assay	94.5% min.
Distillation range First drop 95% (1-96 ml) Dry point	 295.0°C. min. 8.0°C. max. 310.0°C. max.

OTHER MONSANTO INTERMEDIATES

Benzene Sulfonic Acid, Technical
Benzoic Acid, Technical
Benzotrichloride
Benzyl Chloride
Cyclohexylamine
2,5-Dichloroaniline
2,4-Dichlorophenol
Dicyclohexylamine
2,4-Dinitroaniline
2,4-Dinitrochlorobenzene
meta-Chloroaniline
meta-Nitrochlorobenzene
nitro-Dichlorobenzene
ortho-Aminobicyclohexyl, Refined
ortho-Anisidine
ortho-Chloroaniline
ortho-Chlorophenol
ortho-Nitroaniline
ortho-Nitrobiphenyl, Technical
ortho-Nitrochlorobenzene
ortho-Phenetidin
ortho-Vanillin (2-Hydroxy-3-Methoxy Benzaldehyde, Technical)
ortho-Veratraldehyde (2, 3-Dimethoxy Benzaldehyde, Technical)
para-Anisidine
para-Chloroaniline
para-Chlorophenol
para-Nitrochlorobenzene
para-Nitrophenol
para-Phenetidin
para-Toluenesulfonamide
para-Toluenesulfonyl-chloride
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Phenol Sulfonic Acid, 65% and 70%
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Phosphorous Trichloride
Phthalyl Chloride
Salicylic Acid, Technical
Sodium Benzoate, Technical
Thiourea
Toluenesulfonic Acid, 94%

Used as an intermediate in dyestuff synthesis, Monsanto's ortho-Aminobiphenyl, Technical, also finds applications in the synthesis of rubber products. It is specifically used in making phenanthridine derivatives, quinoline yellow, and carbazole.

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BETWEEN THE LINES

Natural Gas Testimony Stresses Chemical Industry Significance

Although the chemical industry generally has indicated it takes no stand on controversial matters involved in the Federal Power Commission's year-long investigation of the natural gas industry, many aspects of the investigation impinge on the chemical field, and have received wide attention as developed in the concluding phases of the investigation.

THE phases of the Federal Power Commission's natural gas industry investigation which have proved to be of special interest to the chemical industry are: remaining supplies of natural gas; relative value of natural gas as a source of chemical raw materials or as a general heating fuel; use of natural gas in chemical manufacture; chemical processes using natural gas; and potentialities of developing new fuels through chemical research. Collaterally the industry has considerable interest also in the competitive situation between gas and coke, as many coke by-products enter chemical production, and there was a strong contention during the hearings that severe competition from gas tended to drive coke production out.

Testimony of Federal experts furnished reassuring information as to natural gas supplies, and undiscovered gas reserves "probably will be large," according to evidence presented by Hugh D. Miser, geologist of the Geological Survey, Interior Department. Moreover, Wilbert Huff, Bureau of Mines engineer, reported that coal can be gasified satisfactorily, though at a prohibitive cost as a competitor of natural gas. Arno Fieldner of the Bureau of Mines told the hearings that "cheap natural gas undoubtedly will be the first raw material used commercially for production of synthetic liquid fuels."

Some of these projections will be explored in a later article. Meanwhile, Warren N. Watson, secretary of the Manufacturing Chemists' Association, who was one of the first experts summoned for the final hearings, pointed out that an entirely new industry has been developed based on components of natural gas as a raw material. Production of synthetic organic chemicals has risen from 650,000,000 pounds in 1929 to more than 10,600,000,000 pounds in 1944.

Even so, other witnesses contended, chemical uses alone count for less than 1 per cent of annual natural gas production. There was some diversity of opinion, also, as to whether its value as fuel outweighs its current chemical propensities.

Some of the uses of various natural gas components were described by Mr. Watson. He pointed out that while methane finds some uses as raw material in the synthetic organic chemical industry, the most valuable components for chemical manufacture are the ethane, propane, and butane contents of natural gas.

These fractions, he said, which otherwise would be used only as fuel, can be used as raw materials for many chemical products of value both in peacetime and for national defense—products whose worth is far beyond that of the raw materials as fuels. Furthermore, he continued, these components may be extracted from natural gas without detracting appreciably from the heating value of the gas.

A natural gas composition, he stated, had been assumed consisting of 90 per cent methane, 5.5 ethane, 3.5 propane, and 1.0 per cent butane. As such, the untreated natural gas has a heating value of 1136 BTU per cubic foot. Treated for removal of those components needed for chemical use, the result is production of hydrocarbon concentrates amounting to 82,000 cubic feet of ethane, propane and butane for each 1,000,000 cubic feet of gas treated. The remaining residue gas, available for heating, has a value for this purpose of 1031 BTU per cubic foot.

Discussing the value of natural gas for use as chemical raw material, compared with its value as fuel, Mr. Watson said:

"If 10,000,000 cubic feet per day of natural gas is burned as fuel, its value is represented merely as the value of heat produced, and would amount to approximately $730,000 per year, with gas evaluated at $0.20 per 1,000 cubic feet.

"On the other hand, if hydrocarbon concentrates from natural gas, in an amount having the same heating value as 10,000,000 cubic feet per day of natural gas, were utilized as chemical raw material, the over-all economic benefits would be many times the value of the same material as fuel.

"To utilize this amount of hydrocarbon concentrate raw material in chemical manufacture would require a chemical plant having an investment approximating $25,000,000. Such a plant would employ directly about 1,500 men in the operation of the plant and the plant would produce in the order of 200,000,000 pounds per year of chemical products. In addition to natural gas, such a plant would utilize other raw materials as required for chemical manufacture, and would normally use in the order of 200,000 tons per year of coal for steam production and would consume approximately 9,000 k.w. of electric power. It is apparent that natural gas and its components are of greater importance as raw materials than they are a simple fuel."

Coke Industry Viewpoint

Referring to some of the other issues in more detail, including the impact of natural gas on coke, W. R. Morris, vice president of Koppers Company, pointed out to the Commission that the by-product coke industry turns out from its own plants five primary materials—coke, gas, tar, light oil and derivatives, ammonium sulfate and ammonia liquor—that alone have an annual value of more than $600,000,000. Besides, he said, the industry uses 97,000,000 tons of coal per year in its by-product ovens, which produce approximately 67,000,000 tons of furnace, industrial and domestic coke, in which the above-mentioned vital elements are resulting products.

The revenue from by-product gas from these operations, he pointed out, is an important factor in their continued existence. In fact, he said, merchant coke plants cannot continue to operate if they lose their gas revenue.

"Merchant plants provide the coal tar distilling industry with a stable source of tar," he continued, "which yields such important products as creosote, tar acids, and naphthalene, and provide for this industry 160,000,000 gallons of crude tar per year."

Also, he pointed out, production of light oil by these merchant plants is of paramount importance as a source of supply to the chemical industry.

He pointed to the place of ammonium sudfate as the basic source of nitrogen for commercial fertilizer manufacture, amounting to 170 million pounds of ammonium sulfate per year.

However, he emphasized, as definitely a gas industry, the merchant by-product coke plants cannot exist without a full and sound distribution of gas produced.

"Failing to have a market for gas," he said, "these plants are finished."

This witness illustrated the competitive situation of coke versus gas by citing the Koppers plant in St. Paul, Minn., having a carbonizing capacity of approximately 400,000 tons per year, which, he declared, with the distribution of straight natural gas in St. Paul, "will close down within a year."

(Turn to Page 397)

Got a Problem?

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Photo of scale model of Victor Exhibit

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NATIONAL CHEMICAL EXPOSITION

CHICAGO COLISEUM, SEPT. 10-14

BOOTHS 41-42-43

NEW PRODUCTS & PROCESSES

Elemental Fluorine on Market NP 355

FLUORINE has been put on the market for the first time by the Pennsylvania Salt Manufacturing Company, it was announced recently. Pennsalt announced it now is available in steel pressure cylinders on a limited commercial basis for experimental use by manufacturers and researchers.

Hundreds of uses for fluorine are foreseen that may become possible with the availability of it in its elemental form. Some outstanding ones are a non-inflammable, non-toxic liquid with a high enough boiling point and specific gravity that it can replace mercury in the present mercury vapor boiler, making the most efficient vapor engine practical and safe; a gas, already developed but requiring elemental fluorine to manufacture, which is a nearly perfect insulator for high voltages used in x-ray and nuclear physics; a lubricating oil so stable that it will not oxidize or break down under any present engine or mechanical operations and will make possible gears and engines heretofore only dreamed of by designers because no lubricant made could withstand their pressure and friction; and an insecticide, already made by the Germans but too costly to be practical with present methods.

Other uses for fluorine compounds now definitely within the realm of possibility include heat transfer and dielectric media, other insecticides, fungicides, fumigants, germicides, stable solvents, anesthetics, fire extinguishers and fireproofing materials, resins, plastics and weed killers.

The biggest problem in their project, said Whitemarsh laboratory researchers, was packaging the gas after it was manufactured. The fact that steel and copper will resist fluorine corrosion very well at normal temperatures was a great help, but detailed research was necessary to develop gaskets to make the present containers leak-proof and safe.

A comparatively small amount of the gas is packed in each cylinder, at present one-half pound at 400 pounds pressure.

The gas is produced in an especially designed electrolytic cell containing potassium fluoride and hydrogen fluoride at about 100° C. The products of this electrolysis are hydrogen and fluorine. A special diaphragm extending into the electrolyte is necessary to prevent these two gases from combining explosively.

Another problem in manufacture is the complete elimination of water from the cell, since in its presence the process gives off oxygen instead of fluorine.

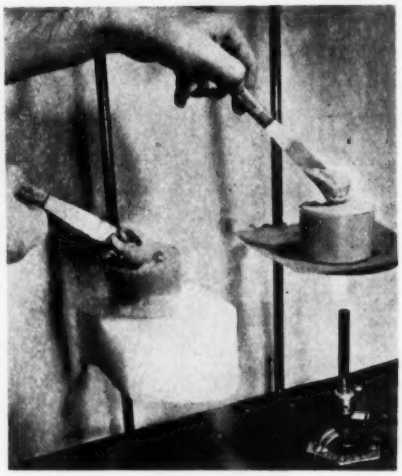
New Plasticizer for GR-A And Neoprene Cements NP 356

Irvington Varnish & Insulator Company has announced that recent laboratory tests on Furetone 5510, a thermosetting resin, reveals that it is an excellent plasticizer for GR-A and Neoprene cements. This resin is unique in that it is miscible with synthetic rubber and does not require an accelerator, such as sulphur or hexamethylenetetramine. A synthetic rubber cement containing Furetone 5510 is stable at room temperature. The physical properties of cured synthetic rubber films are noteworthy. Not only have improved bonding properties been obtained, but also increased resistance to solvents, oils, acids, and alkalies.

The supply of Furetone 5510 is unlimited. Samples for investigation will gladly be forwarded upon request by the Irvington company.

Low-Temperature Grease NP 357

Development of a new synthetic, low temperature grease which demonstrates a wider range of operating temperatures



New Texaco synthetic grease retains body at –100° F. on dry ice and at +300° F. on bunsen burner.

than any other aircraft lubricant is announced by The Texas Company. Known as Texaco Uni-Temp Grease, the lubricant finds applications wherever extremely low temperatures are encountered and where satisfactory performance for short periods at temperatures as high as 300° F. are also required.

Approved under the rigid requirements of the recently released AN-G-25 Specification, this one product matches the performance of the four aircraft greases previously required in the application temperature range of –100° F. to +300° F. The grease does not lose its fundamental lubricating characteristics at any temperatures likely to be found on the ground or at any altitude in aircraft.

It is a lithium base grease in which a synthetic compound is employed as the oily constituent. It is light tan in color and has a buttery texture. It is also put out in a form containing rust inhibitors for use where excessive moisture or salt sprays may be encountered.

Silver Polishing NP 358

Ordinarily, metal articles to be silver plated are immersed in a bath of silver cyanide plating solution and negative cur-

rent sent through, causing a deposit of pure silver upon the objects. When they are removed from the bath, they are evenly plated with silver but are white and lusterless. They must be buffed by hand on a revolving wheel treated with some sort of buffing compound to impart the necessary shine. Buffing not only entails an extra handling of every piece but the loss of a certain proportion of the silver through abrasion.

A chance discovery led to a new method, where the silver plated object is immersed in a bath of silver cyanide solution normal to the regular plating operation. Instead of sending negative current through the bath as in plating, however, positive current is applied in about four times the amperage used to plate the metal, but not continuously. The positive energy is applied for a few seconds, discontinued, then sent through again, and this intermittent action repeated for several cycles. When the article has reached its peak of luster, it is taken out of the bath, rinsed, and dried. The entire operation takes little more than a minute.

Ideal industrial practice would be to immerse the metal pieces—many at a time—send through negative current to silver plate them, then intermittent positive charges to attain the bright finish—all in the same bath. Besides eliminating the whole buffing process, this procedure would have the advantage of retaining right in the original solution the small quantity of silver removed by the electrolytic action of the cyanide while polishing.

The new method has been so successful that it is being used in the Westinghouse Research Laboratories to polish silvered contactors, items of switchgear, microwave apparatus, radar sets and other devices needed in experimental work. For many years heretofore buffing has been the standard treatment.

This electro-polishing process unquestionably possesses the benefits of saving time, labor and material. Tests are now being conducted that may show, also, that the bright finish imparted to plated silver by this method is definitely superior in brilliance, wearing qualities and tarnish resistance compared to the polish given by mechanical buffing.

Metal-Ammonia Solutions Excite Interest NP 359

Major new phenomena in physics and physical chemistry have been discovered by Dr. Richard A. Ogg, Jr., associate professor of chemistry at Stanford University, in experimental studies of metal-ammonia solutions.

While of primary interest to scientists, these discoveries indicate possible practical application in the transmission of electricity without loss due to resistance, and in the development of improved detectors of infra-red light rays.

Because much electricity generated for use is lost in transmission, scientists long have sought a "super-conductive" material which would eliminate such loss. About 30 or 40 super-conductors—such as tin, mercury and lead—are known, but they have super-conductive properties only if their temperature is held to within a few degrees of absolute zero, which is minus 273 degrees Centigrade.

However, Dr. Ogg's solutions, after rapid freezing, "show the essential features of super-conductivity" at temperatures as high as minus 85 degrees Centigrade.

"While transmission of electricity without resistance is not in sight at the moment," Dr. Ogg said, "one at least can begin to wonder about the possibilities of super-conductivity."

Use of the solutions in infra-red ray detectors, however, probably is much nearer, he said. His solutions would serve as the light-sensitive surface from which electrons are emitted when struck by infra-red rays.

Infra-red rays, already rather widely used for such purposes as photographing objects through fog or clouds, were extensively investigated during the war for military purposes. For example, they could be used for communication between ships in convoy at night when they would be less easily picked up by the enemy than visible blinker signals or ordinary radio signals.

Dr. Ogg's studies, begun independently about a year ago, are being continued under sponsorship of the Navy Department's Office of Research and Inventions, which is also sponsoring several scientific research projects at Stanford.

The materials he is studying are liquid ammonia solutions of alkali metals (such as lithium, sodium and potassium) and alkaline earth metals (barium, calcium and strontium).

2,4-D Esters and Morpholine Salt NP 360

J. T. Baker Chemical Company, announces the release of methyl and n-amyl esters of 2,4-D acid and the morpholine salt of 2,4-D acid for formulation research purposes only.

These new organic chemicals are products of Baker's organic research and will shortly be in volume production. They will be manufactured in the new units under erection at the Phillipsburg plant.

Polyvinyl Chloride Plasticizer NP 361

The hitherto unexcelled properties of Paraplex G-25, the plasticizer that revolutionized the science of compounding polyvinyl chloride and synthetic rubber stocks, have been further developed by Resinous Products and Chemical Company to produce a new plasticizer with many unique qualities. Known as Paraplex G-40, the new plasticizer is not subject to spue, migration or extraction by aliphatic solvents, and, like Paraplex G-25, becomes an integral part of the composition of stocks. While both plasticizers have resistance to extreme heat, to oil and to ultra-violet and weathering, combined with good low temperature flexibility, Paraplex G-40 shows markedly improved solvent resistance, appreciably lighter color, lower viscosity at elevated temperatures, but slightly poorer low-temperature flexibility.

Paraplex G-40 is of especial interest to compounders of vinyl and synthetic rubber stocks and for other applications where the unique properties of a polymeric plasticizer are desirable. It is particularly recommended for compounding specialty stocks such as those used for coated fabrics, unsupported sheeting, electrical jackets, adhesives and oil and heat resistant gasket stocks.

Hexaethyl Tetraphosphate NP 362

Production in the United States of a war-time German insecticide able to kill many garden and orchard insects immune to DDT has been announced by Monsanto Chemical Co.

The announcement said the new product would be formulated by insecticide manufacturers for use as a spray or dust.

It was explained that the new insecticide, hexaethyl tetraphosphate, would "take up the slack" left by DDT which is not effective against certain insects. Unlike DDT, the new product is particularly effective against aphids and mites which feed on foliage and are most commonly found in orchards, vegetable and flower gardens.

Used in conjunction with DDT, chemists said, hexaethyl tetraphosphate would tend to "restore a balance in nature." They explained that the mites and aphids multiply abnormally with the extinction by DDT of their natural insect enemies, thus making the aphid and mite control problem more pressing where DDT is used. The new product will kill mites and aphids on contact and thus it is not necessary for these insects to swallow the material. Although tests are NOT complete, there is reason to believe that the new insecticide may be found of value in the control of other insect pests.

Wetting Agent for Wool Carbonization NP 363

Dexolene, a new product recently announced by the Textile Chemical Division of the Dexter Chemical Corp., is used for dyeing, fulling, scouring, and carbonizing. This superior wetting-out agent speeds production and markedly improves the handle of the finished goods.

Dexolene is a sodium salt of an alkyl naphthalene sulfonic acid. It is furnished in liquid form, and is readily soluble in water at all concentrations.

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How long it will be before some of our needed raw materials become available to us again in sufficient quantities . . . to stock our warehouses . . . to fill your orders . . . we don't know, today. But as soon as conditions permit, we have all the tracks laid to serve you fast . . . and we promise that you will know about it.

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NEW CHEMICALS FOR INDUSTRY

Chemical Industries *presents here a catalog of new chemicals and chemical specialties introduced by its advertisers during 1945-46. The arrangement of these listings departs from the practice of former years in that the specialties are grouped separately following the chemicals. These products will be displayed in* Chemical Industries' *exhibit at the 4th National Chemical Exposition, Chicago Coliseum, Chicago, Ill., Sept. 10 to 14, 1946.*

A

N-ACETYL-dl-TRYPTOPHANE

Mol. wt., 246.1. Glistening, colorless, odorless and tasteless crystals; M.P., 207-8°. Sparingly sol. in cold water, readily sol. in hot water, alcohol and dilute sodium hydroxide solution; insol. in dilute mineral acids. Suggested uses: Stabilization and fortification of blood albumin; nutritional experiments. Available in commercial quantities. Winthrop Chemical Co., Inc.

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$CH(COOH):C(COOH)CH_2COOH$. Mol. wt., 174.11. M.P., 180°C. with sl. dec. Solubility in cold water: about 1 part/3 parts water. White to yellowish crystals. More acidic than citric acid, forms normal and acid salts, esters, acid esters, mixed esters, amides, etc. Readily attacked by oxidizing agents. Suggested uses: Synthetic resin synthesis, antioxidants. Chas. Pfizer & Co.

ADIPOL-BCA*

(Dibutoxyethyl Adipate)

$(CH_2)_4$ $(COOC_2H_4OC_4H_9)_2$. Refractive index @ 25°C., 1.442. Sp. gr. @ 20°C./20°C., 0.997± 0.005. Boiling range @ 4 mm., 200°C. to 220°C. Solubility in water @ 25°C., 0.2%. Odor, mild, butyl type. Color, maximum no. 25 Hazen Pt.-Co. Acidity, maximum 0.06% as acetic acid. Moisture, maximum 0.1%. Vapor pressure @ 150°C., 0.20 mm. Hg. Weight per gallon @ 20°C., 8.31 lbs. A very efficient plasticizer for polyvinyl resins, nitrocellulose, ethyl cellulose, chlorinated rubber, synthetic rubbers, etc. Compositions plasticized with Adipol-BCA have excellent resistance to ultra-violet light, flexibility at extremely low temperatures, permanence, and in general good hand and appearance. Ohio-Apex Inc. (* *Trade-mark registry applied for.*)

ALKENYL SUCCINIC ACIDS

Liquid dibasic acids represented by the general formula:

$$\begin{array}{l} R{-}CHCOOH \\ \quad\quad | \\ \quad HCHCOOH \end{array}$$

where R represents an aliphatic hydrocarbon with olefinic unsaturation. Properties vary with the length of the side chain, although all are pale yellow oily liquids. The alkenyl succinic acids are dibasic acids derived from the alkenyl succinic acid anhydrides by hydrolysis with distilled water and are usually prepared as a homogeneous solution containing eighty weight per cent acids and twenty weight per cent water. Pure acids may be obtained by very careful removal of water by azeotropic distillation or by careful hydrolysis of the anhydrides with theoretical amounts of water. The acids exhibit some surface activity, which is more pronounced upon partial neutralization. Ability to emulsify hydrocarbon-water mixtures is sharply affected by partial neutralization. Suggested uses: For emulsification of hydrocarbon-water systems in the acid phase. For the preparation of emulsion in the acid phase where it is desirable to break the emulsion and have the emulsifying agent dissolve in the aqueous phase. Available in limited quantities for research and development work. The Solvay Process Co.

ALLYL DIGLYCOL CARBONATE

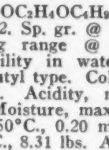
$(C_3H_5OCO_2C_2H_4)_2O$. Mol. Wt., 274.3 Sp. Gr., 20/4, 1.143; R.I., $n^{20}D$ 1.4503; B.P., 160°C. at 2.0mm. Hg; Viscosity at 25°C., 9 centipoises. Relatively insoluble in water but soluble in many organic solvents. Compatible with many resins and polymers. Polymerizes to a thermoset polymer on heating with peroxides, and copolymerizes with a variety of other unsaturated copolymerizable compounds. Exhibits characteristic reactions of unsaturated compounds such as addition of halogens and hypohalous acids, and oxidation. Odor, none to slightly allylic. Suggested uses: As a plasticizer, solvent, or softening agent; as a convertible plasticizer; as a copolymerization agent with other unsaturated copolymerizable compounds, and for the production of resins of a thermosetting allyl type. Available in commercial quantities. Columbia Chemical Division, Pittsburgh Plate Glass Company.

m-AMINOACETOPHENONE

Mol. wt., 135.2. Tan, crystalline solid. Available in limited commercial quantities. The Dow Chemical Co.

4-AMINOANTIPYRINE

Mol. wt., 177. Practically colorless crystals, M.P., 108°-9°, producing no appreciable color in 2% aqueous solution.



Uses: Detection of phenols and halogenated phenols as described by Gottlieb and Marsh (*Ind. & Eng. Chem., Anal. Ed. 18*-16, 1946). Available in laboratory quantities. Winthrop Chemical Co., Inc.

2-AMINO-3-METHYLPYRIDINE

$C_5H_3N(CH_3)(NH_2)$. Mol. wt., 108.14. Suggested uses: Of special interest in pharmaceuticals and also have suggested applications in synthetic insecticides, rubber chemicals, petroleum additives, and organic syntheses. Reilly Tar & Chemical Corp.

p-AMINOPROPIOPHENONE

Mol. wt., 149.2. Light yellow crystals. Available in limited commercial quantities. The Dow Chemical Co.

AMMONIUM ZIRCONYL CITRATE

Probable formula $(NH_4)_4$ $ZrO(C_6H_5O_7)_2$. Mol. wt., 557. ZrO_2, 22.5%; $H_3C_6H_5O_7$, 68.5%; N, 9.5%. Apparent density (tightly packed), 56.8 lbs. per cu. ft. Solubility, very sol. in water at all temperatures. Acidity, 5% solution has a pH of 6 at 25°C. Color, light tan. Physical state: Crystalline solid. Chemical properties: Stable in alkali to pH 10. Little or no change in pH on refluxing. Is hygroscopic. Possible uses: Mordanting and dyeing of leather and textiles. Available in experimental quantities. Rohm and Haas Co.

AMMONIUM ZIRCONYL TARTRATE

Probable formula $(NH_4)_2$ $[(ZrO)_2(C_4H_4O_6)_3]$ $.5H_2O$. Mol. wt., 784. ZrO_2, 31.5%; $H_2C_4H_4O_6$, 57.5%; N, 3.5%; H_2O, 10.5%. Apparent density (tightly packed), 79.9 lbs. per cu. ft. Solubility, very sol. in H_2O at all temperatures. Acidity, 5% solution has a pH of 4 at 25°C. Color, light tan. Physical state, crystalline solid. Chemical properties: Stable in alkali to pH 10. Little or no change in pH on refluxing. Is hygroscopic. Possible uses: Mordanting and dyeing of leather and textiles. Protein precipitant. Available in experimental quantities. Rohm and Haas Co.

AMYL AMMONIUM PHOSPHATE

Ammonium salt of amyl acid phosphate. 100% gray paste, 80% gray viscous liquid. pH of 1% solution, 7. Available in pilot plant quantities. Monsanto Chemical Co.

n-AMYL 2,4-DICHLOROPHENOXYACETATE

An almost colorless liquid having a specific gravity at 25° of 1.210. It contains the equivalent of 76.1% 2, 4-D acid, so 1.318 pounds of the normal amyl ester are equivalent to 1 pound of the 2, 4-D acid. It is insoluble in water, but is soluble to the extent of 30% or more in a wide variety of organic solvents, including benzene, xylene, acetone, toluene, dioxane, ethyl and isopropyl alcohol, kerosene, diesel oil and aromatic petroleum fractions. Like the methyl ester, it is usually applied on turf in the form of an emulsion in water, the stock solution being a solution of the ester in an organic solvent to which a suitable emulsifying agent has been added. For formulation into weed killers. J. T. Baker Chemical Co.

AMYL ISOCYANATE

(Mixed Isomers)

$C_5H_{11}NCO$. Mol. wt., 113.16. Boiling range, 125-140°C. Odor, very intense lachrymator. Color, water white or slightly yellow liquid. Chemical properties: Shows typical reactions of isocyanates with active hydrogen. Suggested uses: Organic synthesis, textile-treating processes, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

B

BENZAMIDE

Mol. wt., 121.13; melting point, 125°C.; boiling point, 290°C.; flash point, 164°C.; fire point, 185°C.; soluble in alcohol, acetone, hot water, and hot benzene, slightly soluble in cold water and other solvents. White, free-flowing monoclinic crystalline material. Physical and chemical properties suggest its possible application in the field of organic synthesis, including plastics, pharmaceuticals and dyestuffs. It is compatible with a limited number of resins including cellulose acetate and nitrocellulose with which it forms a firm, transparent film. Hooker Electrochemical Co.

BENZYL BROMIDE

Mol. wt., 171.0. Colorless to slightly yellow liquid, painful to the eyes. Used as an intermediate in making foaming agents, as an antiseptic for yeast, and in tear gas. Available in experimental quantities. Dow Checimal Co.

B.P., 78-79°C. at 10 mm. Hg; sp. gr., 1.443 at 17°C. Color: Colorless to light straw. J. T. Baker Chemical Co.

BENZYL CYANIDE

Mol. wt., 117.05. Boiling point, 230-235°C. Sp. gr., 1.01, 15.5/15.5°. Refractive index, 1.5205-1.5215 at 25°. Appearance: Amber liquid, aromatic odor. Uses: Intermediate in organic preparations such as phenylacetamide, phenylacetic acid. Availability: Commercial quantities. The Edwal Laboratories, Inc.

$C_6H_5CH_2CN$. Mol. wt., 117.15. Colorless liquid. Sp. gr., approximately 1.01. Refractive index, 1.521. Boiling point, 230-234°C. Suggested uses: As an intermediate for chemical manufacture. Available in commercial quantities. Monsanto Chemical Co.

N-BENZYLPHTHALIMIDE

$C_{15}H_{11}O_2N$. Mol. wt., 237.24. Melting Point, 112-113°C. Soluble in hot alcohol and hot acetic acid. Insoluble in water. Capable of aromatic and imide properties. Serves as a source of benzylamine. Useful in the compounding of certain pharmaceutical preparations. Available in experimental quantities. National Aniline Division.

p-BIPHENYL ISOCYANATE

$C_6H_5 \cdot C_6H_4NCO$. Mol. wt., 195.21. Boiling range, 135-145°C. @ 2 mm. Odor, practically none. Color, white crystalline solid. Chemical properties: Shows typical reactions of isocyanates with active hydrogen. Suggested uses: Organic synthesis, textile treating process, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

BISMUTH SUBACETATE

$BiOCH_3COO$. Mol. wt., 284. White powder, insoluble in water, soluble in glacial acetic acid. City Chemical Corp.

BOROPHOSPHORIC ACID

A white, isotropic, amorphous or micro-crystalline solid. It is water-soluble and non-hygroscopic. It gives a strongly acid solution. P_2O_5, 57.3%. Loss on ignition, 14.4%. Density, 2.13 (25°C.). Suggested uses: Where a solid non-hygroscopic form of phosphoric acid is desired; as an acid catalyst. Victor Chemical Works.

α-BROMOBUTYRIC ACID

$CH_3CH_2CHBrCOOH$. Mol. wt., 167.0. Colorless liquid. Available in limited commercial quantities. The Dow Chemical Co.

α-BROMO-n-CAPROIC ACID

$CH_3CH_2CH_2CH_2CH\ BrCOOH$. Mol. wt., 195.1 Fuming, slightly yellow liquid with a pungent odor. Available in experimental quantities. The Dow Chemical Co.

BROMOETHYLAMINE HYDROBROMIDE

$CH_2BrCH_2NH_2HBr$. Mol. wt., 214.9. Deliquescent crystals, very soluble in water. Available in experimental quantities. The Dow Chemical Co.

β-BROMOPROPRIONIC ACID

$CH_2Br\ CH_2COOH$. Mol. wt., 153.0. White to straw-colored, lustrous plates with a sharp acidic odor. Available in experimental quantities. The Dow Chemical Co.

3-BROMOPYRIDINE

C_5H_4NBr. Mol. wt., 158.0. Clear to straw colored liquid with a characteristic odor. Used as a chemical intermediate. Available in limited commercial quantities. The Dow Chemical Co.

BROMOTRICHLOROMETHANE

$CBrCl_3$. Mol. wt., 198.3. Colorless liquid with a sweet odor. Available in experimental quantities. The Dow Chemical Co.

BUTOXYETHOXYETHYL CHLORIDE

$C_4H_9OC_2H_4OC_2H_4Cl$. Mol. wt., 177.5. Possible reactions: With alkalies to give a vinyl ether, with salts and related compounds to introduce cyanide, mercaptan, sulfonate, carboxylate, malonic ester, acetoacetic ester, cyanoacetic ester groups, etc. With ammonia to form amines. With amines to make higher amines and quaternary ammonium compounds. Also of potential interest as a solvent. Available in commercial quantities. Rohm & Haas Co.

N-*n*-BUTYLCARBAZOLE

$C_6H_4N(C_4H_9)C_6H_4$. Mol. wt., 223.14. M.P., 57.5°C., B.P., 359.6°C. Suggested uses: Plasticizer, rubber softening agent, organic synthesis. Available in 95 per cent purity. Reilly Tar & Chemical Corp.

BUTYL "CELLOSOLVE" STEARATE (Distilled)

$C_{17}H_{35}COOC_2H_4OC_4H_9$. Mol. wt., 384. Freezing point, 15°C. Boiling point, 230°C. at 2 mm. Color, almost water white. Sp. gr., 0.881 at 25°C. Acidity, less than 0.3% as stearic. Iodine number, 2.0 max. Chemical properties: Flash point, 395°F. Volatility (4 hours at 105°C.), 0.034%. Soluble in alcohols, ketones, esters, aromatic and aliphatic hydrocarbons, fats, oils and waxes; insoluble in water. Compatible with vinyls, ethyl cellulose, cellulose nitrate, waxes. Suggested uses: Plasticizer for vinyl resins, cellulose esters and synthetic rubber; lubricant for textiles and leather. Arnold, Hoffman & Co., Inc.

BUTYL LAURATE (Distilled)

$C_{11}H_{23}COOC_4H_9$. Mol. wt., 256. Freezing point, −10°C. Boiling point, 165-175°C. at 2 mm. Color (platinum cobalt scale), 50 ppm. Sp. gr., 0.857 at 25°C. Acidity, less than 0.2% as lauric. Iodine number, 1.0. Chemical properties: Flash point, 310°F. Volatility (4 hours at 105°C.), 6.6%. Soluble in alcohols, fats, oils and more common organic solvents; insoluble in water. Compatible with cellulose esters, fats and waxes. Suggested uses: Lubricant for textiles; plasticizer for resins, cosmetic preparations, printing inks. Arnold, Hoffman & Co., Inc.

BUTYL LAURO-MYRISTATE

A mixture of $C_{11}H_{23}COOC_4H_9$ and $C_{13}H_{27}COOC_4H_9$. B.P., 160-220 @ 15 mm. A synthetic ester used as a plasticizer for various plastics and in cosmetics. The Beacon Co.

BUTYL PALMITATE (Distilled)

$C_{15}H_{31}COOC_4H_9$. Mol. wt., 312. Freezing point, 10°C. Boiling point, 190-210°C. at 2 mm. Color (platinum cobalt scale), 250 ppm. Specific gravity, 0.865 at 25°C. Acidity, less than 0.3% as palmitic. Iodine number, 2.0 max. Chemical properties: Flash point, 365°F. Volatility (4 hours at 105°C.), 0.44%. Soluble in alcohols, ketones, organic solvents, fats, oils and waxes; insoluble in water. Compatible with cellulose esters and waxes. Suggested uses: Lubricant for textiles, paper stencils, leather; plasticizer for synthetic resins, cosmetic preparations, printing inks. Arnold, Hoffman & Co., Inc.

p-sec.-BUTYL PHENOL

Mol. wt., 150.2. White crystalline solid with a characteristic butyl phenol odor. Used as a resin intermediate. Available in commercial quantities. The Dow Chemical Co.

C

CALCIUM HYDRIDE

CaH_2. Mol. wt., 42.1. M.P., 816°C. Density, 1.8 g/cc. Guaranteed purity, 95 per cent. Chemical properties: Reacts rapidly with water, oxygen and nitrogen at room temperature. Evolves nascent hydrogen at high temperature. Suggested uses: Convenient source of hydrogen; drying agent; reducing and condensing agent. Commercially available in various forms and grades. Metal Hydrides, Inc.

CALCIUM NITRIDE

Ca_3N_2. Mol. wt., 148.26. Density, 2.63. M.P., 900°C. Suggested uses: High temperature vacuum melting; in ceramics; to provide nascent nitrogen. Available as a powder. Metal Hydrides, Inc.

CAPRYLYL PEROXIDE (40% in Non-volatile Solvents)

$[CH_3—(CH_2)_6—CO]_2O_2$. Mol. wt., 286.40. Active oxygen, 2.2%. A highly active liquid peroxide preparation free from inorganic impurities. Light yellow oil, insoluble in water, soluble in organic solvents and monomers. Low temperature polymerization catalyst. Available in moderate quantities, samples on request. Lucidol Division, Novadel-Agene Corp.

CARBON TETRABROMIDE

CBr_4. White crystals, slightly volatile and painful to the eyes. Available in experimental quantities. The Dow Chemical Co.

CARBOXYMETHOCEL*

Carboxymethocel S, the sodium salt of cellulose glycolic acid, is produced in the form of a white, free flowing powder in a wide range of viscosity types. As a synthetic product, maximum uniformity and purity is assured. It is soluble in hot and cold water, producing uniform colloidal solutions for use in formulations requiring an exceptionally stable thickener, emulsion stabilizer, or protective colloid. It is an excellent suspending and dispersing agent for pigments. Sizings and coatings are odorless, tasteless, colorless, and useful where oil and grease resistance is required. Its wide range of properties are being utilized in the food, pharmaceutical, paper, textile and leather industries. Carboxymethocel A, the aluminum salt of cellulose glycolic acid, has physical properties and uses similar to those of Carboxymethocel S. The principal difference is its solubility behavior since it is insoluble in both hot and cold water. Solutions are obtained through the use of organic and inorganic bases such as the amines, sodium hydroxide, ammonia, or trisodium phosphate. Carboxymethocel S and A are both available in limited commercial quantities. The Dow Chemical Co. (*Trademark.)

p-CHLOROACETOPHENONE

$Cl—C_6H_4—COCH_3$. Mol. wt., 154.6. Pale, straw-colored liquid with an odor resembling caraway. Available in limited commercial quantities. The Dow Chemical Co.

p-CHLOROBENZOYL PEROXIDE

$(p—ClC_6H_4CO)_2O_2$. Mol. wt., 311.12. Purity, 95% (min.); M.P., 135°C. (dec.); active oxygen 4.9% (min.). White, granular catalyst compound. Somewhat less active than Lucidol, benzoyl peroxide. Insoluble in water, moderately soluble in most organic solvents. Suggested use: Polymerization catalyst at temperatures above 80°C. Available in moderate quantities, samples on request. Lucidol Division, Novadel-Agene Corp.

CHLORODIBROMOMETHANE

$CHClBr_2$. Mol. wt., 208.3. Colorless liquid with a sweet odor. Available in experimental quantities. The Dow Chemical Co.

CHLOROETHYL "COCONATE"

$RCOOCH_2CH_2Cl$, where R=alkyl groups of cocoanut oil fatty acids. Possible reactions: With salts and related compounds to introduce cyanide, mercaptan, sulfonate, carboxylate, malonic ester, aceto-acetic ester, and cyanoacetic ester groups, etc. With ammonia to form amines. With amines to make higher amines and quaternary ammonium compounds. Available in commercial quantities dependent on supply of cocoanut oil. Rohm & Haas Co.

β-CHLOROETHYL FORMATE

A water-white, water-soluble, easily hydrolyzable ester of high flash point. The vapor at low concentrations is toxic to insects. Boiling range, 129-134°C. Specific gravity, 1.245 (26°C.). Refractive index N_D, 1.426 (25°C.). Flash point (open cup), 114°F. Suggested applications: As a grain fumigant of low flammability and as a special solvent. Victor Chemical Works.

x-CHLOROPHENOTHIOXIN

$C_6H_4\langle{}^{S}_{O}\rangle C_6H_3Cl$. Mol. wt., 234.7. Available in experimental quantities. The Dow Chemical Co.

α-(o-CHLOROPHENOXY) PROPIONIC ACID

Mol. wt., 200.6. White to tan crystals. Used as a plant growth control agent. Available in limited commercial quantities. The Dow Chemical Co.

β-CHLOROPROPIONIC ACID

CH_3ClCH_2COOH. Mol. wt., 108.5. White, crystalline solid. Available in experimental quantities. The Dow Chemical Co.

CHROMOUS CHLORIDE, ANHYDROUS

Primarily useful for oxygen absorption and determination. It is a strong reducing agent. Eimer & Amend.

CUPRIC TARTRATE

$CuC_4H_4O_6 \cdot 3H_2O$. Mol. wt., 265.7. Light green powder soluble in 1/1500 water, soluble in acids. City Chemical Corp.

CUPROUS BROMIDE

Cu_2Br_2. Mol. wt., 287.0. A yellow-green solid. Available in experimental quantities. The Dow Chemical Co.

CUPROUS IODIDE

Cu_2I_2. Mol. wt., 380.98. Specific gravity, 5.6. Brownish white powder, insoluble in water, alcohol and dilute acids. City Chemical Corp.

3-CYANOPYRIDINE

C_5H_4NCN. Mol. wt., 104.1. White crystalline solid with a sweet odor. Used as a chemical and pharmaceutical intermediate. Available in limited commercial quantities. The Dow Chemical Co.

CYCLOHEXANE
(85% Minimum Purity)

Commercial quantities of cyclohexane from petroleum are available for the first time. It is free of aromatics, has a relatively high solvency power and may be used to replace benzene and toluene in many instances, and is useful in the manufacture of rubber cements. It is a desirable chemical intermediate for many well-known processes and no doubt will find uses in many new chemical processes. Phillips Petroleum Co.

CYCLOHEXYLACETIC ACID

Mol. wt., 142.2. Colorless to straw-colored liquid. Used as a chemical intermediate. Available in limited commercial quantities. The Dow Chemical Co.

ω-CYCLOHEXYLCAPROIC ACID

Mol. wt., 198.3. Colorless to straw-colored liquid. Used as a chemical intermediate. Available in limited commercial quantities. The Dow Chemical Co.

ω-CYCLOHEXYLBUTYRIC ACID

Mol. wt., 170.2. Colorless to straw-colored liquid. Used as a chemical intermediate. Available in limited commercial quantities. The Dow Chemical Co.

CYCLOHEXYL ISOCYANATE

$C_6H_{11}NCO$. Mol. wt., 125.17. Boiling range, 165-168°C. Odor, very intense lachrymator. Color, water-white or slightly yellow liquid. Chemical properties: Shows typical reactions of isocyanates with active hydrogen. Suggested uses: Organic synthesis, textile-treating processes, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

ω-CYCLOHEXYLPROPIONIC ACID

Mol. wt., 156.2. A colorless to straw-colored liquid. Used as a chemical intermediate. Available in limited commercial quantities. The Dow Chemical Co.

ω-CYCLOHEXYLVALERIC ACID

Mol. wt., 184.2. Colorless to straw-colored liquid. Used as chemical intermediate. Available in limited commercial quantities. The Dow Chemical Co.

D

n-DECYL BROMIDE

$C_{10}H_{21}Br$. Mol. wt., 221.18. Boiling point, 119.5°C. @ 15 mm. Insoluble in water. Sweet, water-white liquid. Suggested uses: Introduction of the n-decyl group in organic synthesis; preparation of medicinals, pharmaceuticals, wetting agents, plasticizers and other organic chemicals. Available in research quantities. Halogen Chemicals.

l-DESOXYEPHEDRINE

$C_6H_5—CH_2—CHNHCH_3—CH_3$. Mol. wt., 149. B.P., 84-5°/8 mm. $n\ ^{20}D$: 1.5097. D : −15.85°. Purity, 98%. Available in research quantities. Suggested use: May be employed in nasal jellies as a vascoconstrictor. Winthrop Chemical Co., Inc.

DIALLYL PHTHALATE

$C_6H_4(CO_2CH_2CH : CH_2)_2$. Refractive index @ 25°C., 1.520. Sp. gr. @ 20°C./20°C., 1.120± 0.003. Boiling range @ 4 mm., 158°C. to 195°C. Solubility in water @ 20°C., practically insoluble. Odor, mild, slightly lachrymatory. Color, maximum no., 100 Pt-Co. Acidity, maximum 0.03% as acetic acid. Moisture, maximum 0.1%. Weight per gallon @ 20°C., 9.33 lbs. A polymerizable monomer with the aid of heat and catalyst (such as benzoyl peroxide). Low pressure laminates and castings made from diallyl phthalate are highly impervious to the action of water, solvents, and other chemicals, and have glossy surfaces with high abrasion resistance. Ohio-Apex, Inc.

p-DIAZODIMETHYLANILINE—ZINC CHLORIDE DOUBLE SALT

Very soluble in water. Appearance: Pale yellow to orange crystals. Light sensitive diazo compound which is used in direct process print making. Availability: Commercial quantities. The Edwal Laboratories, Inc.

1,2-DIBENZOYLETHYLENE

C_6H_5-CO-CH=CH-CO-C_6H_5. Mol. wt., 236.25. Melting Point, 109-110°C. Easily soluble in glacial acetic acid, benzene and chloroform. Soluble in hot, but slightly soluble in cold ethanol. It exhibits independently the properties of an aromatic hydrocarbon, an olefin, a 1,4-diketone, and a conjugated system. It has versatile possibilities as an intermediate in synthesis. It has been used in the preparation of light sensitive films. Available in experimental quantities. National Aniline Division.

3,5-DIBROMOANILINE

$Br_2C_6H_3NH_2$. Mol. wt., 251. Glistening white crystals; M.P., 55-56.5°. Suggested uses: This unusual aniline derivative with substituted groups in the meta position offers interesting possibilities for organic syntheses. Winthrop Chemical Co., Inc.

1,2-DIBROMOBUTANE

$CH_3CH_2CHBrCH_2Br$. Mol. wt., 215.9. A colorless liquid with a sweet odor. Available in experimental quantities. The Dow Chemical Co.

1,4-DIBROMOBUTANE
(Tetramethylene Dibromide)

$CH_2BrCH_2CH_2CH_2Br$. Mol. wt., 215.94. Colorless liquid with sweet, pleasant odor. Insoluble in water but soluble in most common organic solvents. Suggested uses: Introduction of the tetramethylene group in organic synthesis and the preparation of medicinals, pharmaceuticals, and other organic chemicals. Available in research quantities. Halogen Chemicals.

1,2-DIBROMO-2-PROPENE
(β-Bromoallyl Bromide)

$CH_2 : CBrCH_2Br$. Mol. wt., 199.9. Boiling range, 141-43°C. Odor, sweet, olefinic, lachrymatory. Color, water-white. Chemical properties: The very active allylic bromine atom and the double bond furnish two very effective points of reaction. Suggested uses: Intermediate in the preparation of insecticides, disinfectants, pharmaceuticals, medicinals, dyestuffs, acetylenic hydrocarbons and other organic chemicals. Available in research quantities. Halogen Chemicals.

DIBUTYL PHOSPHITE

$C_8H_{19}O_3P$. Mol. wt., 194.21. Almost colorless, mobile liquid. Refractive index, 1.422 @ 25°C. Boiling point, 118-120°C. @ 1 mm. Insoluble in water; soluble in most organic solvents. Suggested uses: Plasticizer, high boiling solvent, paint remover and intermediate for syntheses. Available in experimental quantities. Monsanto Chemical Co.

DIMETHYL SULFITE

$(CH_3O)_2SO$. Mol. Wt., 110.1; Sp. Gr., 20/4, 1.213; R.I., $n^{20}D$ 1.4096; B.P., 125.5°C., at 740 mm. Hg; Surface Tension at 20°C., 33.7 dynes per cm.; Flash Point (open cup), 115°F.; Sol. in water at 25°C., approximately 12% by weight. Slowly hydrolyzed by water at 25°C. Miscible with many organic solvents, and a solvent for many resins and plastics. Odor, mild, acetone-like. Suggested uses: As a solvent or softening agent for organic materials and as an intermediate in organic synthesis. Available in semi-commercial quantities. Columbia Chemical Division, Pittsburgh Plate Glass Company.

1,3-DIBUTYLTHIOUREA (Corrosion Inhibitor 1143)

$C_4H_9NHCSNHC_4H_9$. Mol. wt., 188.39. Melting range, 59-63°C. Color, buff. Odor, faint. Solubility (room temp.) in aqueous media, 0.02-0.06%. Solubility (room temp.) in hydrocarbon oils, 0.4%. Solubility (room temp.) in vegetable oils, over 2%. Uses: Pickling of carbon steel with hydrochloric acid. May be used in acidic or neutral media, not recommended for use in alkaline solutions. Available in commercial quantities. Sharples Chemicals, Inc.

1,4-DICARBETHOXY-2,5-CYCLOHEXANEDIONE

Mol. wt., 256.24. Melting Point, 155°C. Difficulty soluble in cold or hot water. Moderately soluble in hot methanol. May be considered as a cyclic entity of two equivalents of acetoacetic ester. It exhibits many of the properties of the latter, yielding, for example, pyrazolones and O- as well as C- substituted derivatives. It is capable of simultaneous hydrolysis and decarboxylation to cyclohexanedione-1,4. Available in experimental quantities. National Aniline Division.

3,4-DICHLOROBENZENESULFONIC ACID

Mol. wt., 227. Appearance: White crystals. Uses: Precipitant for Histidine. Organic synthesis intermediate. Availability: Commercial amounts. The Edwal Laboratories, Inc.

1,1-DICHLORO-1,2-DIBROMOETHANE

$C\ Cl_2BrCH_2Br$. Mol. wt., 256.8. A colorless liquid with a sweet odor. Available in experimental quantities. The Dow Chemical Co.

2,5-DICHLORONITROBENZENE

Mol. wt., 192.0. Yellow crystalline solid with a mild odor. Available in limited commercial quantities. The Dow Chemical Co.

3,4-DICHLORONITROBENZENE

Mol. wt., 192.0. Yellow crystalline solid with a mild odor. Available in limited commercial quantities. The Dow Chemical Co.

DICHLORO-Bis-PHENOL A

$[HOC_6H_4, {}_2C(CH_2)_2\ C_6H_2, {}_2OH]Cl_2$. Mol. wt., 297.2. A tan to brown solid with a faint phenolic odor. Available in limited commercial quantities. The Dow Chemical Co.

1,2-DICHLORO-2-PROPENE
(β-Chloroallyl Chloride)

$CH_2 : CClCH_2Cl$. Mol. wt., 110.97. Boiling range, 92-94°C. Odor, sweet, olefinic. Color,

water-white. Versatile intermediate in organic synthesis due to having two very reactive groups, a double bond and an allylic chlorine atom. Suggested uses: Manufacture of insecticides, disinfectants, pharmaceuticals, dyestuffs, medicinals, acetylenic compounds and other organic chemicals. Available in research quantities. Halogen Chemicals.

DICYANDIAMIDE

Mol. wt., 84; purity, 99%; form, white crystalline material; solubility: soluble in water, methyl alcohol, liquid ammonia, slightly soluble in ethyl alcohol, acetone, very slightly soluble in ether and benzene; decomposition point, 206-207°C. A neutral, stable, non-toxic compound. Considered as basic raw material. Possible applications in many fields as explosives, resins fireproofing compounds, dyestuffs and a host of others. Many possibilities as an organic intermediate. Available in commercial quantities. American Cyanamid Co.

1,3-DIETHYLTHIOUREA (Corrosion Inhibitor 1148)

$C_2H_5NHCSNHC_2H_5$. Mol. wt., 132.22. Melting range, 72-76°C. Color, buff. Odor, faint. Solubility (room temp.) aqueous media, 3%. Solubility (room temp.) hydrocarbon oils, 0.05%. Solubility (room temp.) vegetable oils, 0.1%. Uses: Pickling with sulfuric acid, pickling cast iron with hydrochloric acid, reducing corrosion of ferrous metals and aluminum alloys in brine. Recommended for use in acidic or neutral media, but not in alkaline. Available in commercial quantities. Sharples Chemicals, Inc.

DIGITOXIN

A digitalis glucoside from *Digitalis puerpera*. Used medicinally for digitalis therapy. J. T. Baker Chemical Co.

4,4'-DIHYDROXY DIPHENYL SULFONE

Mol. wt., 250.3. Practically odorless, grey powder. Available in commercial quantities. The Dow Chemical Co.

DIISOPROPYLBENZENE

$C_6H_4[CH(CH_3)_2]_2$. Mol. wt., 126.2. Clear, colorless liquid with a mild, pleasant odor. Boiling range at 760 mm. Hg, 5-95%, 203.3-206.3°C. Specific gravity at 25/25°C., 0.871. Freezing point, −40°C. Available in commercial quantities. The Dow Chemical Co.

4,4'-DIMETHOXYSTILBENE

$CH_3OC_6H_4CH{=}CHC_6H_4OCH_3$. Mol. wt., 241.28. Melting Point, 211-212°C. This product possesses olefinic, aromatic and ether functions. It offers interesting possibilities in the creation of new dyes and of new drugs concerned with estrogenic disturbances, carcinogenic growths, and haemophilia. Available in experimental quantities. National Aniline Division.

DIMETHYL CARBONATE

$(CH_3O)_2CO$. Mol. Wt., 90.1; Sp. Gr., 20/4, 1.069; B.P., 89.0°C.; Viscosity at 20°C., 0.62 centipoises; Surface Tension at 20°C., 28.0 dynes per cm.; Flash Point (open cup), 66°F.; Sol. in water at 25°C., 15% by weight. Relatively stable to hydrolysis by water. Miscible with many organic solvents, and a solvent for a variety of resins and plastics. Odor, fragrant, characteristic. Suggested uses: As a solvent for organic materials including resins and plastics, and as an intermediate in organic synthesis. Available in semi-commercial quantities. Columbia Chemical Division, Pittsburgh Plate Glass Company.

3-CHLORO-5-DIMETHYLHYDANTOIN

$(CH_3)_2C$-NH-CO-NCl-CO. Mol. Wt., 162.6.

M. P., 145-146°C. Sl. sol. in water and benzene; sol. in acetone and methyl acetate. White crystalline powder whose saturated aqueous solution at 25°C. contains 0.19 percent by weight active Cl. Available in limited quantities for research and development. Electrochemicals Department, E. I. duPont de Nemours & Co.

DIBUTYL SULFITE

$(C_4H_9O)_2SO$. Mol. Wt., 194.3. Sp. Gr., 20/4, 0.996; R.I., $n^{20}D$ 1.4312; B.P., 213-215°C. at 740 mm. Hg; Surface Tension at 20°C., 29 dynes per cm. Relatively insoluble in water and stable to hydrolysis by water. Miscible with many organic solvents and compatible with a variety of plasticizers and resins. Odor, mild, fragrant. Suggested uses: As a high boiling solvent, softening agent or plasticizer, and as an intermediate in organic synthesis. Available in semi-commercial quantities. Columbia Chemical Division, Pittsburgh Plate Glass Company.

2,4-DIMETHYLSULFOLANE

$C_6H_{12}SO_2$. Mol. wt., 148.16; Sp. gr. at 20/4°C., 1.1362; Flash point, 290°F.; Boiling point, 280°C. A highly selective solvent for separation of polar from non-polar materials. Its stability and chemical inertness make it promising for applications in the liquid-liquid and liquid-vapor extraction fields. Shell Chemical Corp.

3-5 DINITRO-4-METHYL BENZOIC ACID

Mol. wt., 226. Melting pt., 156°C. Solubility: Insoluble in water. Appearance: Pale yellow crystals. Uses: Chemical synthesis. Availability: Research quantities from stock. Larger amounts made to order. The Edwal Laboratories, Inc.

3,5 DINITRO-4-METHYL BENZOYL CHLORIDE

Mol. wt., 244.5. Melting point, 56.5-57.5°C. Appearance: Pale yellow crystals. Uses: Preparation of derivatives of sterols, separation of Vitamin D. Availability: Research quantities from stock, larger amounts made to order. The Edwal Laboratories, Inc.

DINONYLNAPHTHALENE

$C_{10}H_6(C_9H_{19})_2$. Mol. wt., 380.41. Distillation, 90% between 360-390°C. Sp. gr. at 20°/20°C., 0.924. Refractive index at 20°C., 1.538-1.542. Viscosity at 25°C., 846.0 centipoises. Wt. per gal., 7.71 lb. Color, light brown to dark amber with deep blue fluorescence. Odor, faintly aromatic. Uses: For sulfonation, intermediate for chemical synthesis, plasticizer. Available in limited quantities. Sharples Chemicals, Inc.

DIPHENYLGUANIDINE

$C_6H_5NHC(:NH)NHC_6H_5$. M. P., 146°C. Soluble in dilute acids, alcohol and hot benzene; almost insol. water. Suggested uses: Rubber accelerator; a free guanide base; see "Guanidine Compounds." Commercially available 98 per cent pure. American Cyanamid Co.

p,p'-DIPHENYLMETHANEDIISOCYANATE

$OCNC_6H_4CH_2C_6H_4NCO$. Mol. wt., 250.25. Boiling range, 170-180°C. @ 1 mm. Odor, none. Color, white to tan crystalline solid. Suggested uses: Organic synthesis, textile-treating processes, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

DIPHENYLMETHYL BROMIDE (Bromodiphenylmethane)

Mol. wt., 247.1. Brown solid, decomposes readily on exposure to air. Available in experimental quantities. The Dow Chemical Co.

DIPROPYLENETRIAMINE

$HN(C_3H_6NH_2)_2$. Specific gravity at 20/20°C., 0.9032. Weight per gallon at 20°C., 7.52 lbs. Boiling point at 760 mm. Hg, 209.1°C. Vapor pressure at 20°C., 0.08 mm. Hg. Coefficient of expansion at 20°C., 0.00091. Freezing point, sets to a glass below −50°C. Solubility in water at 20°C., complete. Solubility of water in it at 20–C., complete. Absolute viscosity at 20°C., 6.7 centipoises. Refractive index at 20°C., 1.4668 n_D. Flash point (open cup), 210°F. Suggested uses: synthesis of dyestuffs, rubber chemicals, wetting agents, water-purification chemicals, and pharmaceuticals. Available in commercial quantities. Carbide and Carbon Chemicals Corporation.

DIPYRIDYLETHYL SULFIDE

$(C_5H_4NCH_2CH_2)_2S$. Mol. wt., 244.2. R.I. n 20/D, 1.5841. Density, 1.113 at 25°C. Slightly soluble in water, soluble in organic solvents, readily forms water-soluble salts with acids. Suggested uses: Synthesis of pharmaceuticals, dyestuffs, herbicides, oil additives, etc. Reilly Tar & Chemical Corp.

DISODIUM DIAMMONIUM PYROPHOSPHATE PENTAHYDRATE

$Na_2(NH_4)_2P_2O_7 \cdot 5H_2O$. Mol. wt., 346.13. A colorless crystalline salt, very soluble in water. Decomposes on heating. pH of 1% solution, 7.8. Monsanto Chemical Co.

DI-*o*-TOLYLGUANIDINE

$CH_3C_6H_4NHC(:NH)NHC_6H_4CH_3$. M.P., 178-179°C. Very sl. sol. water, sol. dilute acids and hot alcohol. Suggested uses: Rubber accelerator; free guanidine base; see "Guanidine Compounds." Commercially available 98 per cent pure. American Cyanamid Co.

DI,TRIISOPROPANOLAMINE MIXTURE

White to slightly yellow crystalline solid with an amine-like odor. Boiling range at 760 mm., Hg., 5-95%, 284-274°C. Specific gravity at 60/25°C., 0.984. Freezing point, 29.5°C. Soluble in water and common organic solvents. Used in textile processing, and as an intermediate for synthetic detergents and emulsifying agents. Available in commercial quantities. The Dow Chemical Co.

DIVINYL BENZENE (Solution)

Mixture of isomers of diethyl, ethyl vinyl and divinyl benzene. Viscosity, 0.90 cps. @ 25°C. Boiling range, 90-105°C. at 50 mm. of mercury. Sp. gr., 0.87-0.885 gms./cc. Flash point, 138°F. Fire point, 147°F. Pounds per gallon, 7.3. Color, colorless to pale straw. Odor, mild aromatic. Copolymerizes with styrene monomer to form a thermoset resin having greater thermal stability and solvent resistance than polystyrene. Monsanto Chemical Co.

n-DODECYL BROMIDE (Lauryl Bromide)

$C_{12}H_{25}Br$. Mol. wt., 249.23. Boiling point, 151°C. @ 15 mm. Insoluble in water. Odor, sweet, fatty. Color, water-white. Useful in the introduction of the n-dodecyl group in organic synthesis and the manufacture of medicinals, pharmaceuticals, plasticizers, wetting agents and other organic chemicals. Available in research quantities. Halogen Chemicals.

DOWANOL 1 2-phenoxyethanol

$C_6H_5OCH_2CH_2OH$. Mol. wt., 138.2. Pale, straw-colored liquid with a faint pleasant odor. Boiling range at 10 mm. Hg., 5-95%, 117-124°C. Specific gravity at 25/25°C., 1.105. Freezing point, −2°C. Soluble in common organic solvents, slightly soluble in water. Used as a solvent. Available in limited commercial quantities. The Dow Chemical Co.

DOWANOL 2 (1-phenoxy-2-propanol)

$C_6H_5OCH_2CHOHCH_3$. Mol. wt., 152.2. Clear colorless liquid with a slightly pleasant odor, Boiling range at 760 mm., Hg., 5-95%, 241-267°C. Specific gravity at 25/25°C., 1.061. Freezing point, 13°C. Soluble in common organic solvents, insoluble in water. Available in limited commercial quantities. The Dow Chemical Co.

DOWANOL 3 [2-(p-sec.-Butylphenoxy) ethanol]

$C_4H_9C_6H_4OC_2H_4OH$. Mol. wt., 194.3. Boiling range at 10 mm. Hg., 5-95%, 159-161°C. Specific gravity at 25/25°C., 1.008. Miscible with common organic solvents, insoluble in water. Available in limited commercial quantities. The Dow Chemical Co.

DOWANOL 4 [2-(p-tert. Butyl phenoxy) ethanol]

$C_4H_9C_6H_4OC_2H_4OH$. Mol. wt., 194.3. Light yellow liquid with a faint pleasant odor. Boil-

ing range at 10 mm. Hg., 5-95%, 154-177°C. Specific gravity at 25/25°C., 1.014. Soluble in common organic solvents, insoluble in water. Available in limited commercial quantities. The Dow Chemical Co.

E

ETHYL ACETAMIDOMALONATE

$CH_3CONHCH(COOC_2H_5)_2$. Mol. wt., 144. White powder, M.P., 93-95°. Suggested use: Synthesis of amino acids and related chemicals. Winthrop Chemical Co., Inc.

N-n-ETHYLCARBAZOLE

$C_6H_4N(C_2H_5)C_6H_4$. Mol. wt., 195.11. M.P., 69.1°C.; B.P., 339.9°C. Suggested uses: Plasticizer, rubber softening agent, organic synthesis. Available in 95 per cent purity. Reilly Tar & Chemical Corp.

ETHYL α,β-DIBROMOPROPIONATE

$CH_2BrCHBrCOOC_2H_5$. Mol. wt., 259.9. Clear, colorless liquid with a strong, ethereal odor. Available in experimental quantities. The Dow Chemical Co.

ETHYLENE CYANOHYDRIN

Mol. wt., 71.05. Boiling point, 227-228°C. Specific gravity, 1.04 at 25°C. Can be readily dehydrated to provide unsaturated intermediates of interest to plastic chemists. Combines the properties and reactivity of both a nitrile and an alcohol. The nitrile radical can be hydrolized to the corresponding acid and the hydroxyl radical can be esterified. Purity, 96/98%; solubility: soluble in acetone, chloroform, ethanol and water; partially soluble in diethyl ether; insoluble in benzene, carbon tetrachloride and naphtha. Available in commercial quantities. American Cyanamid Co.

ETHYL ETHOXYPROPIONATE

$C_2H_5OC_2H_4COOC_2H_5$. Mol. wt., 146. Undergoes claisen condensation, and other typical aliphatic ester reactions. Ethoxy group may be replaced by halogen by reaction with halogen acid, or may be removed to give unsaturated ester. Also of interest as a solvent. Available in commercial quantities. Rohm & Haas Co.

ETHYL GALLATE

$(HO)_3(C_2H_5)C_6H(COOH)$. Off-white powder with a melting point of 143°-194°C. Suggested use: Antioxidant in vegetable oils and fats. Available in small quantities for experimental purposes. Heyden Chemical Corp.

2-ETHYLHEXYL "CELLOSOLVE"*

$C_4H_9CH(C_2H_5)CH_2OCH_2CH_2OH$. Mol. wt., 174.28. Specific gravity at 20/20°C., 0.8859. Boiling point at 760 mm. Hg, 228.3°C. Vapor pressure at 20°C., 0.02 mm. Hg. Refractive index at 20°C., 1.4362 n_D. Viscosity at 20°C., 7.49 centipoises. Heat of vaporization at 1 atm., 133 B.T.U. per pound. Coefficient of expansion at 20°C., 0.00087. Flash point, 230°F. Solubility in water at 20°C., 0.09%. Solubility of water in it at 20°C., 5.4%. A colorless, high-boiling solvent for nitrocellulose and resins, useful in the formulation of inks. A mutual solvent in cutting oils, essential oils, and dry-cleaning compounds. Intermediate in the preparation of plasticizers and surface-active agents. Available in limited quantities. Carbide and Carbon Chemicals Corporation. (* Trade-Mark.)

ETHYL HYDROXYISOBUTYRATE

$(CH_3)_2C(OH)COOC_2H_5$. Mol. wt., 132. Ester of hydroxy acid. Reacts with imides, urea and its derivatives, urethanes, etc., to form a variety of heterocyclic compounds. Hydroxyl group replaceable by halogen. Also of interest as a solvent. Available in commercial quantities. Rohm & Haas Co.

ETHYL ISOCYANATE

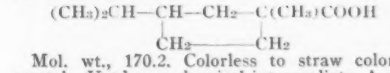
C_2H_5NCO. Mol. wt., 71.08. Boiling range, 58-61°C. Odor, very intense lachrymator. Color, water white or slightly yellow liquid. Chemical properties: Shows typical reactions of isocyanates with active hydrogen. Suggested uses: Organic synthesis, textile-treating processes, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

ETHYL POTASSIUM PHOSPHATE

Aqueous solution of the potassium salt of ethyl acid phosphate. 60% solution in water. Color, water white. pH, 7.5 (on 60% solution). Odor, slightly aromatic. Uses: Solid form has excellent humectant properties, dye intensifier. Available in pilot plant quantities. Monsanto Chemical Co.

F

FENCHOLIC ACID



Mol. wt., 170.2. Colorless to straw colored crystals. Used as a chemical intermediate. Available in limited commercial quantities. The Dow Chemical Co.

FLUORINE

A greenish yellowish gas, weight 0.106 pound per cubic foot at 0°C. at 1 atmosphere pressure, 1.31 times as heavy as air. Can be safely handled in metals such as iron, copper, magnesium, nickel and monel, on which an adherent fluoride film forms to give the necessary protection. Can be condensed below the critical temperature of −129°C. to a liquid of specific gravity 1.11, which boils at −187°C. under 1 atmosphere pressure. Reacts vigorously with most oxidizable substances at room temperature, frequently with immediate ignition, and reacts with most metals at elevated temperatures. Readily displaces chlorine, and other halogens, from the solid metal halides. Reacts with silicon-containing compounds; thus can support the continued combustion of glass, asbestos and so forth. Forms explosive mixtures with water vapor, ammonia, hydrogen, and most organic vapors. Suggested Uses: Preparation of organic fluorine compounds. The fluorine may be reacted directly upon the organic compounds, or reaction may be carried out by the use of metallic fluorides (carrier) such as silver fluoride, cobalt fluoride. These metal fluorides may, in turn, be regenerated by the use of elemental fluorine. Available in ½-lb. quantities as a gas in cylinders at 400 pounds per square inch pressure. Pennsylvania Salt Manufacturing Company.

FUMARYL CHLORIDE

ClCOCH=CHCOCl. Mol. wt., 152.97. Boiling Point, 161-4°/760 mm; 60-62°/14 mm. Sp. gr. 20/20=1.4149. This product is a diacyl halide, having two fairly reactive halogens capable of various condensations. A useful building block in various phases of industrial syntheses. Available in experimental quantities. National Aniline Division.

G

GLYCOLONITRILE

Recommended as an intermediate in the production of pharmaceuticals, dyestuffs, plasticizers, solvents, and a variety of other interesting products. Marketed as a stabilized 50% aqueous solution. American Cyanamid Co.

GUANIDINE COMPOUNDS

From the guanidine compounds, one can obtain reagents which range from strong organic bases to neutral or acid reacting salts. For example, free guanidine, which is readily prepared from guanidine carbonate, exhibits alkalinity nearly as strong as sodium hydroxide. The substitution of aliphatic, alicyclic, heterocyclic, or aromatic radicals produces compounds having a wide range of basicity. Guanidine compounds are highly reactive. For example, the reaction with acid chlorides is useful in the preparation of sulfaguanidine. Diketones react to produce substituted pyrimidines. Aldehydes react to form resin and plastic products. American Cyanamid Co.

GUANIDINE CARBONATE

$[H_2NC(NH_2) : NH]_2H_2CO_3$. M.P., 197-199°C. Very sol. water, very sl. sol. alcohol. Suggested uses: Starting point for other guanidine salts; see "Guanidine Compounds." Available in commercial quantities 96 per cent pure. American Cyanamid Co.

GUANIDINE HYDROCHLORIDE

$H_2NC(NH_2) : NHHCl$. M.P., ca. 183°C. Extremely sol. water. Suggested uses: An unusually water-soluble source of guanidine; see "Guanidine Compounds." Commercially available 95 per cent pure. American Cyanamid Co.

GUANIDINE NITRATE

$H_2NC(NH_2) : NHHNO_3$. M.P., 206-212°C. Soluble water, sl. sol. alcohol. Suggested uses: Intermediate in production of explosives and aminoguanidines; see "Guanidine Compounds." Commercially available 95 per cent pure. American Cyanamid Co.

H

NORMAL HEPTANE (99% +)

This high purity normal heptane is now available in large quantities as a reference fuel for octane number determinations, as a standard in determining the mixed aniline paint, as a high purity chemical intermediate, etc. Phillips Petroleum Co.

HEXABUTYL TETRAPHOSPHATE

Hexabutyl tetraphosphate is a clear liquid with a specific gravity of 1.119 at 25°C. and a refractive index of 1.425 (N_D). It is suggested for use as a substitute for nicotine in insecticidal compositions. Victor Chemical Works.

HEXACHLOROCYCLOHEXANE, TECHNICAL (Benzene Hexachloride)

$C_6H_6Cl_6$. Mol. wt., 290.81. Gray, slightly sticky solid. Used in insecticide formulations. Available in experimental quantities. The Dow Chemical Co.

HEXAETHYL TETRAPHOSPHATE

$C_{12}H_{30}O_{13}P_4$. Mol. wt., 506.44. Sp. gr., approximately 1.28. Crystallizing point, −40°C. Boiling point, decomposes at high temperatures. Color, light yellowish to dark liquid. Miscible in water, acetone, alcohol, benzene, carbon tetrachloride, ethyl acetate, glycerine, ortho-dichlorobenzene, pine oil, toluene, xylene, alkyl napthalenes, etc. Suggested use: It has been found effective against a number of insects including red spiders, aphids and flies at dilutions of 0.25% to less than 0.025%. Available in commercial quantities. Monsanto Chemical Co.

Hexaethyl tetraphosphate is a clear liquid which is soluble in water with some decomposition. It has a specific gravity of 1.280 at 25°C. and a refractive index of 1.425 (N_D). It is suggested for use as a substitute for nicotine in insecticidal compositions. Victor Chemical Works.

n-HEXYL BROMIDE

$CH_3CH_2CH_2CH_2CH_2CH_2Br$. Mol. wt., 165.0. Boiling range, 5%-95%: 2.5° range about 156°. Sp. gr., 1.1725-1.1710 25/25°C. Refractive index, 1.447-1.445, 25°C. Appearance: Colorless to light straw. Uses: Synthesis. Availability: Commercial amounts. The Edwal Laboratories, Inc.

$C_6H_{13}Br$. Mol. wt., 165.08. Boiling point, 156°C. Insoluble in water. Sweet, water-white liquid. Suggested uses: Introduction of the n-hexyl group in organic synthesis; preparation of medicinals, pharmaceuticals, plasticizers, and other organic chemicals. Available in research quantities. Halogen Chemicals.

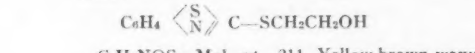
2-HYDRINDYLPHENOXY ETHANOL

$C_{17}H_{18}O_2$. Mol. wt., 254.31. Specific gravity at 25°/15.6°C., 1.030. Refractive index n_D @ 25°C., 1.5972. Boiling range, 200°-215°C. at 4 mm. Product is a pale amber viscous liquid possessing a mild odor. Soluble in alcohols and aromatic hydrocarbons, ketones, esters, etc. Insoluble in water. Compatible with polyvinyl chloride, polystyrene, melamine, urea-formaldehyde, phenolic zein, cellulose acetate, cellulose nitrate, polyvinyl chlor-acetate and other plastic raw materials. Suggested uses: As a plasticizer for use with resins, rubbers and plastic raw materials. As a non-volatile solvent for dyes, resins, insecticides, and other organic compounds. Availability: Experimental laboratory quantities of technical grade. The Neville Co.

m-HYDROXYACETOPHENONE

Mol. wt., 136.1. Tan, crystalline solid. Available in experimental quantities. The Dow Chemical Co.

2-(β-HYDROXYETHYLTHIO)-BENZOTHIAZOLE



$C_9H_9NOS_2$. Mol. wt., 211. Yellow-brown waxy solid with slight mercaptan-like odor which on melting changes to a brown, viscous oily liquid. Melting point, approximately 45°C. Soluble in ethanol, acetone, dioxane, diethyl ether, benzene, carbon bisulfide and carbon tetrachloride; insoluble in dilute caustic, dilute hydrochloric acid and petroleum ether. Suggested uses: As an intermediate; exhibits the reactions typical of a primary alcohol and in the absence of solvent condenses with ethylene oxide. Available in experimental quantities. Monsanto Chemical Co.

p-HYDROXYPHENYLACETIC ACID

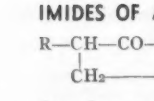
Mol. wt., 152.1. Tan to brown crystalline solid. Available in experimental quantities. The Dow Chemical Co.

1,8-bis-(*p*-HYDROXYPHENYL) MENTHANE

$C_{22}H_{28}O_2$. Mol. wt., 324.44. Melting point, 102°C. minimum. Slightly soluble in benzene, methanol, ethanol and isopropanol. Soluble in aqueous alkalies. Product is pale amber crystalline material. Chemical properties: The two hydroxy groups are very reactive, particularly with active hydrogen atoms leading to many condensations. The mono and di alkali salts are also very reactive and undergo characteristic reactions. The phenolic groups can be further alkylated. Physical properties: Product exhibits polymorphic nature in that the crystalline form when melted and subsequently cooled, becomes hard and resinous as a supercooled liquid. Suggested uses: Modification of drying, semi-drying and non-drying oleo-resinous oils. Manufacture of dyes, pharmaceuticals, resins, plasticizers. Useful in drug, coatings, plastics and miscellaneous compounding industries. Availability: Drum quantities of technical grade. Experimental laboratory quantities of pure grade. The Neville Co.

I

IMIDES OF ALKENYL SUCCINIC ACIDS



Cyclic imides, derived from corresponding dibasic acids, where R represents an aliphatic hydrocarbon group with olefinic unsaturation. Viscous, straw-colored liquids with densities ranging from 1.02 to 1.06. Boiling range approximately 175°C. to 250°C. Insoluble in cold water, slightly soluble in hot water, readily miscible with common organic solvents. Resistant to thermal decomposition and to hydrolysis by moisture. Low volatility and highly compatible with most plastic materials. Suggested Uses: Plasticizer for cellulose acetate, zein, ethyl cellulose, nitrocellulose, various elastomers. Available in limited quantities for research and development work. The Solvay Process Co.

INDOLEBUTYRIC ACID

Mol. wt., 203.2. Light tan powder. Used as a plant growth control agent. Available in experimental quantities. The Dow Chemical Co.

ISOPROPYLAMINE

C_3H_9N. Mol. wt., 59.11; sp. gr. at 20/4°C., 0.689; boiling point, 32.2. Suggested as intermediate in the synthesis of rubber chemicals, surface-active agents, dyes, bactericides, and pesticides, pharmaceuticals, emulsifying agents, textile assistants, plasticizers, and inhibitors. Shell Chemical Corp.

ISOPROPYL FORMATE

Mol. wt., 88.1. Clear, colorless, volatile liquid with a pleasant, non-residual, ethereal odor. Used as a fumigant for dehydrated foods. Available in commercial quantities. The Dow Chemical Co.

ISOPROPYL ISOCYANATE

C_4H_7NCO. Mol. wt., 85.11. Boiling range, 68-73°C. Odor, very intense lachrymator. Color, water-white or slightly yellow liquid. Chemical properties: Shows typical reactions of isocyanates with active hydrogen. Suggested uses: Organic synthesis, textile-treating processes, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

K

KP-201 PLASTICIZER (Dicyclohexyl Phthalate)

$C_6H_4(COO{\cdot}C_6H_{11})_2$ Sp. gr. @ 20°C./20°C., 1.148 (approx.). Boiling range @ 4 mm., 200°C. to 235°C. Solubility in water, practically none. Odor, aromatic. Color, maximum no. 8 Gardner Scale. Acidity, maximum 0.03% as acetic acid. Moisture, maximum 0.1%. Vapor pressure @ 150°C., 0.10 mm. Hg. Weight per gallon @ 20°C., 9.58 lbs. Freezing point, 58°C. (minimum). Cellulose nitrate, ethyl cellulose, chlorinated rubber, cellulose acetobutyrate, cellulose acetopropionate and polyvinyl acetate, chloride, butyral and copolymers are soluble with heat above 60°C. Polystyrene and acrylic resins are compatible. KP-201 is used primarily to increase adhesion, and to decrease moisture vapor transmission. Ohio-Apex, Inc.

L

LACTONITRILE

Recommended for same uses as glycolonitrile. Form: colorless, oily liquid; boiling point, 182/4°C. (slight decomposition). Solubility: Soluble in water, organic solvents. Insoluble in pet. ether and carbon bisulphide; specific gravity: 0.9919 at 18.4°/4°C. Pounds per gallon, 8.3. American Cyanamid Co.

LEAD BROMIDE

$PbBr_2$. Mol. wt., 367.05 Sp. gr., 6.66. Soluble, 1/200 water, insoluble in alcohol. M.P., 373°C. City Chemical Corp.

LITHIUM METAPHOSPHATE

$LiPO_3$. Mol. wt., 85.92. A clear hygroscopic, glass-like material. Soluble in water. Available in laboratory quantities. Monsanto Chemical Co.

M

MAGNESIUM NITRIDE

Mg_3N_2. Mol. wt., 100.98. Suggested uses and availability: Same as for calcium nitride. Metal Hydrides, Inc.

2-MERCAPTOETHYLPYRIDINE

$C_5H_4NCH_2CH_2SH$. Mol. wt., 139.14. B.P., at 13 mm., 106°C.; at 39 mm., 134°C. F.P., −25.0°C. Density at 25°C., 1.084. R.I. n/20D, 1.5605. Solubility in 100 g. water at 20°C., 0.3 g.; solubility of water in 100 g. at the same temperature, 10.7 g. The presence of the sulfhydryl group makes 2-mercaptoethylpyridine a most reactive and versatile pyridine compound. Suggested uses: A polymerization modifier in synthetic rubber; vulcanization accelerator; plasticizer; insecticides and fungicides; synthesis of dyestuffs and pharmaceuticals; preparation of sulfides, thioesters and metal salts; synthesis of pickling inhibitors, flotation agents, emulsifying and wetting agents; and as a solvent. Available in 95 per cent purity, minimum f.p., −27.4°C. Reilly Tar & Chemical Corp.

METAPHOSPHORIC ACID (C. P. Pellets)

HPO_3. This chemical has heretofore been produced in stick form. The pellet form is expected to prove more convenient for use in analytical chemistry, much as pelletized NaOH and KOH have proved more convenient. J. T. Baker Chemical Co.

bis-(METHOXY ETHYL MERCURIC) CARBIDE

Mol. wt., 543.2. Mercury, 73.8%. Melting pt., 134.5°C. Solubility: Insoluble in water. Appearance: White crystals. Uses: In seed disinfecting compositions. Availability: Research quantities; commercial quantities made to order. The Edwal Laboratories, Inc.

METHOXY ETHYL MERCURIC CHLORIDE

Mol. wt., 295.1. Mercury, 67.9%. Melting pt., 69-70°C. Solubility: Insoluble in water, soluble in dilute caustic solutions. Uses: Fungicide, seed disinfectant. Appearance: White powder. Availability: Research quantities; commercial lots made to order. The Edwal Laboratories, Inc.

4-METHOXY-PHENOXYACETIC ACID

$CH_3OC_6H_4OCH_2COOH$. Mol. wt., 182.19. White crystals. M.P., 115-117°. Available in commercial quantities. Suggested use: Plant hormone. Westville Laboratories.

METHYLAMYLAMINE (2-Amino-4-Methyl Pentane)

$CH_3CHNH_2CH_2CH(CH_3)_2$. Mol. wt., 101.2. Solidification point, −65°C. Boiling range, 106-109°C. Sp. gr. at 20°/20°C., 0.747. Refractive index at 20°C., 1.409. Viscosity at 25°C., 0.60 centipoise. Flash point, 55°F. Color, water white. Odor, amine. Uses: Raw material for manufacture of dyestuffs, rubber accelerators, antioxidants, emulsifying agents, desizing agents for textiles, amylated acid amides, and other organic products, particularly where oil solubility is a factor. Available in experimental quantities. Sharples Chemicals, Inc.

METHYL-α-CHLOROPROPIONATE

Mol. wt., 108.6. Water-white liquid with a pleasant, characteristic odor. Available in experimental quantities. The Dow Chemical Co.

METHYL-β-CHLOROPROPIONATE

Mol. wt., 167.0. Colorless liquid. Available in experimental quantities. The Dow Chemical Co.

METHYL-2,4-DICHLOROPHENOXY-ACETATE

Mol. wt., 236.1. A brownish solid which becomes liquid at slightly above room temperature. Used in herbicides. Available in limited commercial quantities. The Dow Chemical Co.

A white crystalline material having a melting point of 43.5°-44°C. It contains the equivalent of 93.9% 2, 4-D acid. Therefore, 1.065 pounds of the methyl ester are equivalent to 1 pound of the free acid. The methyl ester is insoluble in water, but is soluble to the extent of 30% or more in acetone, benzene, xylene, toluene, dioxane and aromatic petroleum fractions, and is moderately soluble in ethyl and isopropyl alcohol. It is also somewhat soluble in refined kerosene and diesel oil. It is usually applied on turf in the form of an emulsion in water, the stock solution being a solution of the methyl ester in an organic solvent to which a suitable emulsifying agent has been added. For formulation into weedkillers. J. T. Baker Chemical Co.

METHYLENE CHLOROBROMIDE (Bromochloromethane)

$BrCH_2Cl$. Mol. wt., 129.4. Clear, colorless liquid with a sweet odor. Boiling range at 760 mm. Hg, 5-95%, 66-68°C. Specific gravity at 25/25°C., 1.916. Miscible with common organic solvents, slightly soluble in water. Available in limited commercial quantities. The Dow Chemical Co.

METHYL GLYCINE HYDROCHLORIDE

$CH_3(NH_2HCl)COOCH_3$. Mol. wt., 125.6. White, or nearly white, liquid. Available in experimental quantities. The Dow Chemical Co.

METHYL HYDROXYISOBUTYRATE

$(CH_3)_2C(OH)COOCH_3$. Mol. wt., 118. Ester of hydroxy acid. Reacts with imides, urea and its derivatives, urethanes, etc., to form a variety of heterocyclic compounds. Hydroxyl group replacable by halogen. Also of interest as a solvent. Available in commercial quantities. Rohm & Haas Co.

METHYLPENTADIENE

C_6H_{10}. Mol. wt., 82.14. Sp. gr., at 20/4°C., 0.7184. Boiling point, 75 to 77°C. at 760 mm. Flash point, −30°F. A conjugated diene which polymerizes or copolymerizes with butadiene to form synthetic rubber having superior processing and curing characteristics, tack, and solu-

bility in solvents. These make methyl-pentadiene polymers and copolymers particularly valuable for rubber cements, coated and proofed goods, and extruded or molded products. Shell Chemical Corp.

MONOISOPROPANOLAMINE

$CH_3CHOHCH_2NH_2$. Mol. wt., 75.1. Clear, colorless liquid with ammoniacal odor. Boiling range at 760 mm. Hg, 5-95%, 158-163°C. Specific gravity at 25/25°C., 0.960. Freezing point, −2°C. Miscible with water and common organic solvents. Used in textile processing, and as an intermediate for synthetic detergents and emulsifying agents. Available in commercial quantities. The Dow Chemical Co.

MORPHOLINE 2,4-DICHLOROPHENOXY-ACETATE

A white crystalline material containing the equivalent of 71.8% 2, 4-D acid. Therefore, 1.394 pounds of the morpholine salt are equivalent to 1 pound of the free acid. The morpholine salt is extremely soluble in water. A 50% solution of the salt, which is equivalent to 35.8% of the free acid, can be cooled to 0°C. without any material crystallizing out. The morpholine salt is stable at room temperature, but if heated several days at temperatures above 100°C. it will gradually decompose. For formulation into weedkillers. J. T. Baker Chemical Co.

N

2-NAPHTHOXYACETIC ACID

Mol. wt., 202.2. Fine white to purplish crystals. Available in limited commercial quantities. The Dow Chemical Co.

NONYLNAPHTHALENE

$C_{10}H_7C_9H_{19}$. Mol. wt., 254.40. Distillation: 90% between 330-350°C. Sp. gr. at 20°/20°C., 0.942-0.947. Color, straw to amber with faint blue fluorescence. Refractive index at 20°C., 1.549-1.555. Viscosity at 20°C., 58 centipoises. Odor, faintly aromatic. Wt. per gal., 7.88 lbs. Uses: For synthesis of surface-active agents especially detergents by sulfonation and as a plasticizer. Available in limited quantities. Sharples Chemicals, Inc.

NONYLNAPHTHALENE (Distilled)

Mixture of mono- and dinonylnaphthalene. Distillation: 90% between 330°-400°C. Sp. gr., 0.938. Color, clear amber. Odor, faintly aromatic. Uses: For synthesis of surface-active agents, especially detergents, by sulfonation, and as a plasticizer. Available in limited quantities. Sharples Chemicals, Inc.

NONYLPHENOL

$C_9H_{19}C_6H_4OH$. Mol. wt., 220.3. Solidification point, 0°C. Boiling range, 90% between 295-304°C. Sp. gr. at 20°/20°C., 0.968. Refractive index at 20°C., 1.517. Flash point, 285°F. Color, straw. Odor, faintly phenolic. Uses: Intermediate in manufacture of oil additives, resins, surface active agents and pharmaceuticals. Available in experimental quantities. Sharples Chemicals, Inc.

O

OCTADECANAMIDE (Stearamide)

$CH_3(CH_2)_{16}CONH_2$. Mol. wt., 283. M.P., 104°C. Flash pt., 225°C. Sl. sol. in most common organic solvents. Water insol. Uses: Antiblock agents, anti-tack agents, synthetic waxes, carbon papers, plasticizers, wax extenders, synthesis, water-proofing agents. Available in carload quantities. Other fatty acid amides available in chain lengths from C_8 to C_{18}, also unsaturated C_{18} members. Armour Chemical Division.

OCTADECANONITRILE

$CH_3(CH_2)_{16}CN$. Mol. wt., 264. M.P., 41°C. B.P., 357°C. Sp. gr., 0.858. Flash pt., 194°C. Non-toxic. Water insol. Soluble in common organic solvents. Uses: Plasticizers, solvents, chemical synthesis. Available in tank cars. Other aliphatic nitriles available in chain lengths of C_8 to C_{18}, also unsaturated C_{18} homologs. Armour Chemical Division.

OCTADECYLAMINE

$CH_3(CH_2)_{16}CH_2NH_2$. Mol. wt., 267. B.P. range, 325-348°C. M.P., 55°C. HCl and acetate salts water-soluble. Surface-active aliphatic amine, sol. in most common organic solvents. Uses: Textile agents, flotation agents, emulsifying agents, rust preventatives, chemical synthesis, rubber retarders and anti-scorch agents. Available in tank cars. Other homologs ranging from C_8 to C_{18} in chain lengths are available, also unsaturated C_{18} members. Armour Chemical Division.

OCTADECYLAMINE ACETATE

$CH_3(CH_2)_{16}CH_2NH_2 \cdot HOOCCH_3$. M.P., 68°C. B.P. (decomposes). Sl. water-soluble. Sol. in most common organic solvents. Uses: Flotation agents, wetting agents, textile assistants, emulsifying agents, surface active agents, chemical intermediates. Available in tank cars. Other aliphatic amine acetates available in chain lengths of C_8 to C_{18}, also unsaturated C_{18} homologs. Armour Chemical Division.

n-OCTADECYL BROMIDE (Stearyl Bromide)

$C_{18}H_{37}Br$. Mol. wt., 333.38. White, waxy solid. Melting point, 35°C. Insoluble in water. Odor, waxy, fatty. Useful in the manufacture of organic chemicals such as medicinals, pharmaceuticals, plasticizers and wetting agents. Available in research quantities. Halogen Chemicals.

OCTADECYL ISOCYANATE (Technical)

$C_{18}H_{37}NCO$. Mol. wt., 295.50. Boiling range, 162-174°C. @ 1 mm. Odor, none. Color, pale yellow, cloudy liquid. Suggested uses: Organic synthesis, textile-treating processes, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

OCTYLPHENOXYETHOXYETHYL CHLORIDE

p—$C_8H_{17}C_6H_4OC_2H_4OC_2H_4Cl$. Mol. wt., 312.5. Possible reactions: With alkalies to give a vinyl ether, with salts and related compounds to introduce cyanide, sulfonate, mercaptan, carboxylate, malonic ester, acetoacetic ester, cyanoacetic ester groups, etc. With ammonia to form amines. With amines to make higher amines and quaternary ammonium compounds. Available in commercial quantities. Rohm & Haas Co.

OCTYLPHENOXYETHOXYETHYL DIMETHYLAMINE

$C_8H_{17}C_6H_4OC_2H_4OC_2H_4N(CH_3)_2$. Mol. wt., 321. High molecular weight tertiary amine. Suggested uses: In the synthesis of pharmaceuticals, insecticides, surface active agents, quaternary ammonium compounds, etc. Available in commercial quantities. Rohm & Haas Co.

OCTYL RESORCINOL

An alkylated resorcinol with a side chain of 8 carbons. While resorcinol has a phenol coefficient of only 0.3, by octylation of resorcinol, the bactericidal properties of this material become 280 times that of phenol. Consequently the material can be used as a bactericidal agent. In view of this it is recommended for incorporation in shampoos, hair tonics and as a general fungicidal and bactericidal agent. Supplied in crystal form or in a formulation. Fine Organics, Inc.

P

PENTAMUL 417

A technical grade of Pentek dioleate with an acid number of approximately 5 and a viscosity at 25°C. of 4 poises. Soluble in aliphatic and aromatic hydrocarbons. Suggested use: Nonionic emulsifying agent. Available in small quantities for experimental purposes. Heyden Chemical Corp.

PHENETHYL BROMIDE (β-Phenylethyl Bromide)

$C_6H_5C_2H_4Br$. Mol. wt., 185.1. A colorless liquid with a sweet odor. Available in experimental quantities. The Dow Chemical Co.

PHENETHYL BUTYRATE (Butyric Acid, 2-Phenylethyl Ester)

$C_3H_7COOCH_2CH_2C_6H_5$. Mol. wt., 192.2. Colorless liquid with a characteristic odor. Available in experimental quantities. The Dow Chemical Co.

p-PHENETOLE CARBAMIDE

Mol. wt., 180.11. Melting point, 170-173°C. (corr). Ash, 0.5%. Heavy metals less than 20 ppm. White needle-like crystals, sweet taste. Uses: Sweetening agent in special dietary foods. Common name, Dulcin. Availability: Research quantities, commercial quantities when raw materials are again available. The Edwal Laboratories, Inc.

PHENYLACETAMIDE

$C_6H_5CH_2CONH_2$. Mol. wt., 135.16. White or faintly yellow crystals. Melting point, 156°C. Soluble in ethanol, slightly soluble in water, diethyl ether, benzene. Available in commercial quantities. Monsanto Chemical Co.

PHENYLACETAMIDE (Tech.)

$C_6H_5CH_2CONH_2$. Mol. wt., 135.16. Melting point, 149-159°. Nitrogen content, 10.1-10.5%. Odor, aromatic. Appearance: Cream colored powder. Uses: Growth stimulator in production of antibiotics. Availability: Commercial quantities. The Edwal Laboratories, Inc.

PHENYL BIGUANIDE HYDROCHLORIDE

A strong base can be readily prepared from the more easily handled hydrochloride. This compound overcomes the effects of metallic contamination resulting from processing operations, handling, or storage. A complex is formed between the aryl biguanide and the metallic impurities in many instances effectively neutralizing the metal catalytic activity. Thus phenyl biguanide can be considered as a metal deactivator or indirectly as an antioxidant. Phenyl biguanide can be used as an intermediate in the preparation of heteroycyclic organic nitrogen compounds—mainly six membered rings containing two or three nitrogen atoms; for example, it reacts with formamide esters and acid chloride yielding substituted 4-n-phenyl guanamines, and with aldehydes and ketones yielding diaminodihydroxytriazines. Physical properties: White solid; mol. wt., 213.5; M.P., 237.0°C. Solubility: Insol. cold H_2O; sol. in hot H_2O. American Cyanamid Co.

2-PHENYLCYCLOHEXANOL

Mol. wt., 176.2. Colorless to light straw-colored, slightly viscous liquid. Used in insect repellent formulations. Available in limited commercial quantities. The Dow Chemical Co.

PHENYLGUANIDINE CARBONATE

$[C_6H_5NHC(:NH)NH_2]_2H_2CO_3$. M.P., 135-137°C. Very sl. sol. water and alcohol; insol. benzene. Suggested uses: Starting point for phenylguanidine salts; intermediate for phenyl-substituted pyrimidines; see "Guanidine Compounds." American Cyanamid Co.

PHENYL GUANIDINE STEARATE

Salt of a strong organic base and a fatty acid and therefore in the general category of soaps. It is potentially valuable wherever detergent or wetting properties are desired or as a lubricant additive. Mol. wt., 419; melting point, softens at 60°C. or 140°F.; pH in water solution, 8.5 at 25°C. (less than 1% solution). Purity, approximately 95%. Sol. in 95% ethanol and in benzene. American Cyanamid Co.

PHENYL ISOCYANATE

C_6H_5NCO. Mol. wt., 119.12. Boiling range, 158-162°C. Odor, very intense lachrymator. Color, water-white or slightly yellow liquid. Chemical properties: Shows typical reactions of

isocyanates with active hydrogen. Suggested uses: Organic synthesis, textile treating processes, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

PHENYL MERCURIC ALKYL MERCAPTIDES

C_6H_5HgSR. (R represents a mixture of isomeric alkyls averaging about 16 carbons in chain length.) Appearance: Yellow viscous liquid. Solubility: Insoluble in water, difficulty soluble in ethanol, completely miscible with most organic solvents such as hexane, benzene, CCl_4, acetone, Stoddard solvent, etc. Uses: Compound is proposed as an oil-soluble fungicide which can be incorporated into paints, varnishes, water repellent compositions, adhesives, etc. Availability: Research quantities; commercial lots made to order. The Edwal Laboratories, Inc.

PHENYL MERCURIC SALICYLATE, NNR

$C_6H_5HgOCOC_6H_4OH$. Mol. wt., 424.82. Mercury, 48.37%. Melting pt., 155-161°C. Appearance: White to pale pink powder. Solubility: 0.1 g/1 in water, 7 g/1 in 95% ethanol, 48 g/1 in benzene, soluble in carbitol. Uses: Active ingredient in fungicidal and bactericidal compositions. Availability: Commercial amounts. The Edwal Laboratories, Inc.

S-PHENYLTHIOMALIC ACID

$C_6H_5SCH(COOH)CH_2COOH$. Mol. wt., 226.24. Melting Point, 116°C. Slightly soluble in cold water. Soluble in hot water. Very soluble in ethanol. It has the functions of a dibasic acid, of a thioether and of an aromatic hydrocarbon. It has possibilities as an intermediate in organic, dye and pharmaceutical syntheses. Possible mild anti-oxidant. It may be useful *per se* and as an intermediate in the creation of pickling agents and corrosion inhibitors. Available in experimental quantities. National Aniline Division.

β-POLYOXYMETHYLENE

$H(CH_2O)xOH$. Extremely slow reacting paraformaldehyde. Rate of solution at pH of 7.8 is approximately 0.1% at 25°C. in 24 hours. Contains 0.5% water. Soluble in alkaline solution. Easily sublimed. Suggested use: As a source of anhydrous monomeric formaldehyde. Available in small quantities for experimental purposes. Heyden Chemical Corp.

POTASSIUM FLUOZIRCONATE

K_2ZrF_6. Mol. wt., 283. ZrO_2, 43.5%; F_2, 40.0%; K_2O, 33.0%; H_2O, 0.00%. Apparent density (tightly packed), 103.5 lbs. per cu. ft. Solubility, 2.36 parts per 100 parts H_2O at 25°C., 8.86 parts per 100 parts H_2O at 50°C. Acidity, 1% solution, pH of 4.3 at 30°C. Color, white. Physical state, crystalline solid. Melting point, 500°C. Chemical properties: Glass is not attacked by the salt or its solution; alkali precipitates zirconia from solution but H_3PO_4 has no effect. The molten salt is stable. Possible uses: The addition of small amounts to molten electrolytes in production of metals and alloys. As a facing compound for light alloy molds. Available in experimental quantities. Rohm & Haas Co.

POTASSIUM ZIRCONYL OXALATE

Probable formula, $K_2H_2[ZrO(C_2O_4)_2]\cdot 4H_2O$. Mol. wt., 523. ZrO_2, 23.5%; $H_2C_2O_4$, 51.5%; K_2O, 18.0%; H_2O, 13.5%. Apparent density (tightly packed), 62.7 lbs. per cu. ft. Solubility, 2.72 parts per 100 parts of H_2O at 25°C., 34.9 parts per 100 parts H_2O at 85°C. Acidity, 5% solution has a pH of 3 at 30°C. Color, white. Physical state, crystalline solid. Chemical properties: Solutions of the salt are very stable but zirconia does precipitate on addition of sufficient alkali. Possible uses: Mordanting and dyeing leather and textiles. In acid fixing baths. Available in experimental quantities. Rohm & Haas Co.

PYROPHOSPHATIDIC ACID NE

This is a dark brown oil, acid in reaction, having a specific gravity of 0.96 at 24° and having a P_2O_5 content of 6 to 8%. It has a molecular weight of about 1300. It cannot be distilled without decomposition. It is soluble in hydrocarbons, chlorinated hydrocarbons, glycerides, acetone, and butanol; sparingly soluble in ethanol; and insoluble in methanol and water. Both the acid and its salts with various amines are oil-soluble surface-active agents. Victor Chemical Works.

S

SILICOTUNGSTIC ACID

Available for preparing high specific gravity solutions and mineral separations. It is useful also as a reagent for the analysis of aconitine, antipyrine, atropine, brucine, nicotine, pyramidon and sparteine. Eimer & Amend.

SILVER SULFIDE

Ag_2S. Mol. wt., 247.8. Sp. gr., 7.3. Grayish black, heavy powder. Soluble in nitric acid, insoluble in water. City Chemical Corp.

SODIUM FLUOROACETATE (1080)

Fl CH_2COONa. Mol. wt., 100.03. Color, fine white powder. Use: Very poisonous rodenticide. Available in commercial quantities to certain restricted outlets. Monsanto Chemical Co.

SORBIC ACID
(2,4 Hexadienoic Acid)

CH_3-CH=CH-CH=CH-COOH. Mol. wt., 112.06. Boiling point at 2 mm. Hg, 100°C.; sublimes and decomposes at 228°C. Melting point, 134.5°C. Ionization constant, K_{25}, 1.73 x 10^{-5}. Heat capacity, Cp. 734.4 cal.; Cu, 742.8 cal. Flash point, approximately 260°F. Solubility in water at 20°C., approximately 0.1% by weight. A white, crystalline solid only slightly soluble in water but readily soluble in most organic solvents and in aqueous alkalies. Since it contains the carboxylic group together with a conjugated system of unsaturated linkages, it undergoes reactions typical of these two groups as well as some unusual reactions. Many of its derivatives undergo the Diels-Alder reaction. It adds halogens, halogen acids and hypohalites; reacts with ammonia, ammonium hydroxide, and organic amines to form many interesting derivatives. The acid and many of its derivatives can be polymerized to interesting products. Suggested Uses: Valuable intermediate for increasing the speed of drying of vegetable oils and in the manufacture of synthetic resins, textile specialties, essential oils, and pharmaceuticals. Available in semi-commercial quantities. Carbide and Carbon Chemicals Corporation.

STEARYLDIMETHYLAMINE

$C_{18}H_{37}N(CH_3)_2$. Contains 10% cetyldimethylamine ($C_{16}H_{33}N[CH_3]_2$). High molecular weight tertiary amine. Suggested uses: In the synthesis of quaternary ammonium compounds, surface active agents, insecticides, etc. Available in pilot plant quantities. Rohm & Haas Co.

SUCCINIC ACID PEROXIDE

$(HOOCCH_2CH_2CO)_2O_2$. Mol. wt., 234.16. Purity, 90% (min.). M.P., 125°C. (dec.). Active oxygen, 6.15% (min.). White powder, moderately soluble in water and oxygenated organic solvents; insoluble in hydrocarbon solvents. Aqueous solutions slowly liberate hydrogen peroxide. Suggested uses: Deodorant; mild antiseptic; bleaching agent for sirups, gums and other water dispersible materials. Available in moderate quantities, samples on request. Lucidol Division, Novadel-Agene Corp.

T

TANTALUM HYDRIDE

TaH. Little is known of its physical and chemical properties. Suggested uses: Electronics industry. Available commercially as a fine powder. Metal Hydrides, Inc.

n-TETRADECYL BROMIDE
(Myristyl Bromide)

$C_{14}H_{29}Br$. Mol. wt., 277.28. Boiling point, 181°C. @ 20 mm. Insoluble in water. Odor, sweet, fatty. Color, water-white. Useful in the manufacture of medicinals, pharmaceuticals, wetting agents, plasticizers and as an intermediate in organic synthesis. Available in research quantities. Halogen Chemicals.

TETRAETHYLAMMONIUM CHLORIDE

$(C_2H_5)_4NCl$. Mol. wt., 165.7. Melting range, 208-211°C. White powder. Odor, none. Uses: Preparation of pharmaceuticals, preparation of tetraethylammonium hydroxide. Available in laboratory quantities. Sharples Chemicals, Inc.

TETRAMETHYLENE CHLOROHYDRIN

$CH_2ClCH_2CH_2CH_2OH$. Mol. wt., 108.57. B.P., 83-84°/15 mm. Colorless liquid having a pleasant odor. Decomposes on heating at atmospheric pressure yielding HCl and Tetrahydrofuran. Use: Raw material for organic syntheses. Available in research quantities. Columbia Organic Chemicals Co.

THIONYL BROMIDE
(Sulphurous Oxybromide)

$SOBr_2$. Mol. wt., 207.9. Fuming orange-yellow liquid with an offensive odor. Used as a chemical intermediate. Available in experimental quantities. The Dow Chemical Co.

TITANIUM HYDRIDE

TiH_2. Mol. wt., 49.9. Suggested uses: Source of titanium for alloys; hardening of copper and copper alloys; copper brazing; analytical determination of iron; analytical reducing agent. Available as a powder in technical and reagent grades. Metal Hydrides, Inc.

TITANIUM NITRIDE

TiN. Mol. wt., 61.91. Density, 5.29. M.P., 3220°C. Suggested uses and availability: See calcium nitride. Metal Hydrides, Inc.

2,4-TOLYLENE DIISOCYANATE

$CH_3\cdot C_6H_3(NCO)_2$. Mol. wt., 174.16. Boiling range, 82-85°C. @ 1 mm. Odor, medicinal. Color, clear, colorless to yellow liquid. Suggested uses: Organic synthesis, textile-treating processes, polymers and plasticizers. Available in pilot plant quantities. Monsanto Chemical Co.

1,1,1,-TRIBROMO-*tert*-BUTYL ALCOHOL
(Acetone-Bromoform)

$(CH_3)_2C(OH)CBr_3$. Mol. wt., 310.8. White crystalline solid with a camphoraceous odor. Available in experimental quantities. The Dow Chemical Co.

TRIBUTYL ACONITATE

$CH(COOC_4H_9)$: $C(COOC_4H_9)CH_2(COOC_4H_9)$. Mol. wt., 342.42. B.P., 190°C. at 3 mm. Hg. Sp. gr., 1.018 at 20°C. R.I., 1.4532 at 26°C. Insoluble in water; soluble in mineral oil and organic solvents. Slightly tinted clear liquid with very slight odor. Suggested uses: Solvent plasticizer for cellulosic plastics; to impart low temperature flexibility to certain types of synthetic rubbers. Chas. Pfizer & Co.

2,4,5-TRICHLOROPHENOXYACETIC ACID

Mol. wt., 255.5. White to tan crystals. Used as a plant growth hormone. Available in experimental quantities. The Dow Chemical Co.

2,4,6-TRICHLOROPHENOXYACETIC ACID

Mol. wt., 255.5. White to tan crystals. Used as a plant growth control agent. Available in experimental quantities. The Dow Chemical Co.

TRICOBALTOUS PHOSPHATE OCTAHYDRATE

$Co_3(PO_4)_2\cdot 8H_2O$. Mol. wt., 511. A pink powdery material. Insoluble in water and dilute alkalies. Soluble in dilute mineral acids of pH 1-2. Available in laboratory quantities. Monsanto Chemical Co.

TRIETHYL ACONITATE

$CH(COOC_2H_5)$: $C(COOC_2H_5)CH_2(COOC_2H_5)$. Mol. wt., 258.27. B.P., 155°C. at 5 mm. Hg. Sp. gr., 1.0957 at 24.5°C. R. I., 1.4517 at 26°C. Slightly sol. in water, moderately sol. in mineral oil, sol. in organic solvents. Slightly tinted clear liquid with a slight odor. Suggested uses: Solvent plasticizer for cellulose plastics, where it imparts excellent resistance to discoloration and embrittlement by light. Chas. Pfizer & Co.

TRIFLUOROACETIC ACID

CF_3CO_2H. Mol. wt., 114. M.P., −15.5°. B.P., 72.4°. Colorless to pale pink liquid which fumes in air. Extremely volatile and best stored in the form of the sodium salt from which it is easily prepared by treating with sulfuric acid. Forms constant boiling mixture with water boiling at 105°. May be used in the preparation of the anhydride, amide or any of the esters. Available in research quantities. Columbia Organic Chemicals Co.

TRIISOPROPYL BENZENE

$C_6H_3:(CH[CH_3]_2)_3$. Mol. wt., 204.3. Clear, colorless, practically odorless liquid. Boiling range at 760 mm. Hg, 5-95%, 230-239°C. Sp. gr. at 25/25°C., 0.856. Freezing point, about −30°C. Available in limited commercial quantities. The Dow Chemical Co.

TRIPENTEK
(Technical tripentaerythritol)

A mixture consisting of approximately 90% Tripentaerythritol, 5% Dipentaerythritol, and 5% Monopentaerythritol whose highly functional nature makes it a valuable ingredient for alkyd resins, synthetic drying oils and rosin esters. Available in commercial quantities. Heyden Chemical Corp.

TRIPROPYLENE GLYCOL

$C_9H_{20}O_4$. Mol. wt., 192.3. Odorless, colorless liquid. Available in limited commercial quantities. The Dow Chemical Co.

V

VINYL CHLORIDE (Inhibited)

CH_2 : CHCl. Mol. wt., 62.5. Colorless liquid under pressure which readily volatilizes to a flammable gas with an odor somewhat similar to that of ethyl chloride. Inhibited with not more than 0.3% of phenol. Sp. gr. at 25/25°C., 0.908. Soluble in alcohol, carbon tetrachloride and ether. Slightly soluble in water. Available in experimental quantities. The Dow Chemical Co.

Z

ZINC N-ETHYL-N-2-CYANOETHYL-DITHIOCARBOMATE

$C_{12}H_{18}N_4S_4Zn$. Mol. wt., 411. Appearance, white solid. Melting point, decomposes before melting. Very slightly soluble in acetone, alcohol, ethyl acetate, benzene and chloroform; insoluble in water. Uses: Insecticide and fungicide, rubber accelerator. Available in pilot plant quantities. Monsanto Chemical Co.

ZINC FORMATE

$Zn(CHO_2)2{\cdot}2H_2O$. Mol wt., 191.45. White granular crystals: Suggested use: In textile finishes. Available in small quantities for experimental purposes. Heyden Chemical Corp.

ZIRCONIUM HYDRIDE

ZrH_2. Mol. wt., 93. Suggested uses: "Getter" and black body in vacuum tubes. Available as a powder. Metal Hydrides, Inc.

ZIRCONIUM NITRIDE

Zr_3N_2; also ZrN. Mol. wt., 301 and 105. Suggested uses and availability: See calcium nitride. Metal Hydrides, Inc.

ZIRCONYL NITRATE

$ZrO(NO_3)_2{\cdot}3H_2O$. Mol. wt., 285. ZrO_2, 41.5%; N, 9.5%; H_2O, 17.5%. Apparent density (tightly packed), 71.8 lbs. per cu. ft. Solubility, water soluble. Acidity, 5% solution has a pH of 3 at 25°C. Color, cream. Physical state, powder. Chemical properties: The dry salt very slowly liberates nitric oxide. Concentrated solutions are stable but on extreme dilution the salt is easily hydrolyzed. Possible uses: Preparation of mixed oxide catalysts, starting material for preparing zirconium derivatives, and as a food preservative. Available in experimental quantities. Rohm & Haas Co.

ZIRCONYL STEARATE

$ZrO(C_{18}H_{35}O_2)_2$. Mol. wt., 673. ZrO_2, 14.4%; H_2O, 17.7%. Apparent density (tightly packed), 0.56, (melted) 0.99. Melting point, 60°C. Solubility: Insoluble in water, soluble in organic solvents through a swelling stage. Color, light tan. Physical state, flakes. Chemical properties: Can be melted in the presence of H_2O without hydrolysis. Decomposed by strong acids and alkalies. Possible uses: Water repellents, grease and oil additives. Available in experimental quantities. Rohm & Haas Co.

ZIRCONYL SULFATE

$ZrOSO_4{\cdot}\frac{1}{2}H_2SO_4{\cdot}2H_2O$. Mol. wt., 288. ZrO_2, 42.5%; SO_4, 49.5%; H_2O, 12.5%. Apparent density (tightly packed), 77.0 lbs. per cu. ft. Solubility, 3.67 parts per 100 parts of water at 25°C., 105 parts per 100 parts of water at 85°C. Acidity, 1% solution has pH of 1.7 at 25°C. Color, white. Physical state, granular solid. Chemical properties: Characteristic of zirconyl salts of strong mineral acids. Hydrous zirconia is precipitated from solution above pH 2. The salt is not hygroscopic. The salt decomposes at 800°C. Possible uses: Intermediate for the preparation of other zirconium compounds, protein precipitant. Available in experimental quantities. Rohm & Haas Co.

New Chemical Specialties

A

"A" RESIN

Heat reactive hydrocarbon resin, for use in conjunction with linseed or other reactive oils or resins to produce flexible, clear or pigmented finishes having good color, adhesion, and durability. Specific gravity, 25°C., 0.93-0.96; Softening point °C., 85 min.; intrinsic viscosity 0.1-0.3 (M.W. 1500-3000); iodine number 100-150; Odor, none; Taste, none; Acidity, none; Color, clear, light amber. Soluble to about 50 to 60% by wt. in aliphatic and aromatic hydrocarbons and chlorohydrocarbons, slightly soluble in higher ketones and esters and insoluble in water, alcohol, inorganic acids and alkalies. May be used for clear and insulating varnishes, white enamels, paints and can coatings. Other suggested uses are adhesives, printing inks, compounding agents and tackifiers for synthetic elastomers. Standard Alcohol Co.

ACRYLIC COPOLYMER EMULSION 629-29E

A copolymer emulsion derived from acrylic resins. Possesses good stretchability and strength, and requires no external plasticizers. Can be used for leather and paper coatings and saturants. As a pigment binder, it possesses good adhesion, water resistance, mechanical stability, and gloss. American Resinous Chemicals Corp.

ACRYLIC EMULSIONS 474-12

Emulsion developed primarily for use in textile and leather trades. Available as high solids, water-thin emulsions with dispersed resin phase having fine particle size, resulting in excellent stability, long shelf-life, and good spraying, dipping and swabbing properties. Wide variance in film properties obtainable by modification of type and amount of copolymer ingredients. Emulsions depositing clear, transparent films are available; 474-12 deposits soft and rubberlike film; 350-26 deposits hard and tough film. Excellent water-resistant qualities in dried films. Suggested uses: 474-12—pigment binder for leather finishes, textile size, impregnant to strengthen paper stock. 350-26—heat sealing adhesive, textile size. Specifications: Solids, 30%; viscosity, water thin; color, milk white; monomer content, less than 0.1%; wt./gal., 8.6 lbs. 8-7 lbs; pH, 5-6. American Resinous Chemicals Corp.

ADHESIVE 539-10

A general use adhesive which yields a strong, tacky, water-resistant bond. Recommended for case sealing, as a low cost ice-box adhesive for bottle and can labels, and for frozen food containers; lamination of paper, leather, fabrics, cardboard, foils, cork, wood, etc. 539-10 Adhesive will adhere to most coated surfaces including enamel, paint, and wax. This product and variations of it can be admixed with starches and dextrines to impart tack, flexibility, water-resistance, quick stick, and toughness, Also can completely replace starches, dextrines and glues for many applications. American Resinous Chemicals Corp.

ADHESIVE 607-1B, HOT MELT GENERAL PURPOSE

Hot melt adhesive with good adhesion to all paper surfaces, glass, wood, metal foils, leather and most plastic films. Clear color. Application temperature 300-350°F. Odorless, tasteless, nontoxic. This melt can be readily dissolved in either aliphatic or aromatic hydrocarbons and used as a liquid glue. American Resinous Chemicals Corp.

ADHESIVE 602-47A

A non-neoprene adhesive composed of synthetic resins and elastomeric polymers. Deposits a tough, pressure sensitive film with excellent retack characteristics. Will not affect cellulosic fibers. Can be used for both "wet" and "dry" stick operations. Viscosity suitable for use by spray, brush, or roller coating. American Resinous Chemicals Corp.

ALROHYDRINES

A series of novel water soluble plasticizers and humectants recommended for use in glues, cosmetics, paper, adhesives, textile printing. Alrose Chemical Co.

ALROSOL C

A 100% active fatty amide wetting agent, detergent, and foamer, suitable for use in cosmetics, specialties. Available in experimental quantities. Alrose Chemical Co.

ALROSOL S

Water dispersible emulsifier and thickener especially suited for cosmetic creams, wax polishes. Available in commercial quantities. Alrose Chemical Co.

ALRO WATER SOFTENER

A highly active lime soap dispersant and foam builder; stable in aqueous solution. Available in experimental quantities. Alrose Chemical Co.

AP FOAM REDUCER

Transparent, liquid emulsion to reduce foaming in latex compounds and resin emulsions, in addition of one to two parts per hundred. S. G. .965; pH 10.—11; weight per gallon, 8.04; solids, 60.5 per cent. Permits use of high speed machines for applying latex and reduces pin holes caused by air bubbles in dipping compounds. Adhesive Products Corp.

AQUAZINC

Concentrated aqueous dispersion of zinc stearate made with a volatile wetting agent. Can be used in cements, adhesives, butyl rubber, latex and for spraying moulded goods before curing. The Beacon Co.

ARMOWAX

Brittle, high-melting, easily shined, nitrogen-containing synthetic wax. M.P., 132°C. (270°F.) minimum. Penetration (200 gms., 5 sec. @ 25°C.), 0.2. Color, light tan. Acid value, approx. 12. Sap. value, approx. 17. Available in commercial quantities. Chemical Division, Armour & Co.

AROCLOR 5419

$C_{18}H_{12}.4Cl_{1.6}$. Mol. wt., 285.4 (average). Yellow, soft, sticky resin. Distillation range, 185-

285°C. @ 4 mm. Sp. gr., 1.182 @ 90/15.5°C. Crystals appear in product at 75°C. Suggested uses: Plasticizer and dielectric. Available in laboratory quantities. Monsanto Chemical Co.

AROCLOR 5428

$C_{18}H_{11.8}Cl_{2.8}$. Mol. wt., 316.4. A yellow, waxy resin. Distillation range, 198-305°C. @ 4 mm. Refractive index, $N_D^{25°}$, 1.662. Pour point, 22°C. Sp. Gr., 1.242 @ 90/15.5°C. Suggested use: Plasticizer and dielectric. Available in laboratory quantities. Monsanto Chemical Co.

AROMATIC OIL, GRADE 1

Highly aromatic petroleum oil boiling approximately 430° to 680° F and very satisfactory as a carrier for chlorphenols in wood treating solutions; also used in the blending of creosote wood treating mixtures and as a flux oil in the recovery of coal and gas tars. Sp. gr. 0.937 at 60° F. Wt. per gal., 7.8 lbs. Flash, COC, 195° F. Aniline number, 45. Viscosity, SUV at 100 F, 40. Phillips Petroleum Co.

ASCORBIC & CITRIC ACID MIXTURE

Intimate mixture of ascorbic and citric acids designed to prevent browning due to oxidation of frozen and cut fruits. It is readily soluble in water or sugar syrups. The small white crystals are free-flowing and non-caking. An average analysis of the product shows: Citric Acid (Anhydrous) 96%; Ascorbic Acid 4%. Chas. Pfizer & Co. Inc.

ATLAS G-1243-I

A mixed tall oil lauric acid ester of polyoxyalkylene sorbitol with a small percentage of isopropyl alcohol. An emulsifier specially recommended for DDT-solvent concentrates. Form: Amber liquid dispersible in water; Viscosity: Approx. 450 cp. at 25° C.; Acid No.: 10 to 20; Specific Gravity: Approx. 1.06; Solubility: Soluble in commonly-used solvents for DDT emulsifiable concentrates such as alkylated naphthalene-hydrocarbon mixtures. Available in quantity. Supplied in 1 gallon and 5 gallon cans and in 55 gallon drums. Shipping weight 8.5 lbs. per gallon. Atlas Powder Co.

ATLOX 1045-A

A mixed oleic-lauric acid ester of polyoxyalkylene sorbitol. A superior emulsifier for DDT-solvent concentrates and other toxicants applied from solvent or oil emulsions. Form: Light yellow liquid, easily dispersible in water; Viscosity: Approx. 200 cp. at 25° C.; Acid No.: 5 to 9; pH (10% aqueous dispersion) 5.5 to 7.0; Solubility: Soluble in alkylated naphthalenes, aliphatic and aromatic hydrocarbons and most organic solvents. Atlox 1045—A is available in quantity. It is supplied in 1 gallon and 5 gallon cans and in 55 gallon drums. Shipping weight 8.5 lbs. per gallon. Atlas Powder Co.

A-Z FLAT NO. 60

A light colored organic flatting pigment designed primarily for producing dull finishes in clear alkyd resin or alkyd-urea resin finishes. May be used in some oleo-resinous varnishes. Clear films dulled with A-Z Flat No. 60 are clear and transparent, tough, have good abrasion resistance and may be wheel-compounded to a high gloss. Dull alkyd or oleo resinous varnishes containing A-Z Flat No. 60 have good package stability, do not exhibit thixotropy, geling, seeding or hard settlement. R-B-H Dispersions Division of Interchemical Corp.

B

BEACOLAC 52

A synthetic resin useful as a shellac substitute. It is alcohol-soluble and may be cut with alkalies. M.P.: 284°F.; acid number: 140-150. The Beacon Co.

C

C-64

C-64 is an aromatic specialty used in the preparation of perfume and colognes, has a powerful, spicy odor with a slightly minty touch, somewhat reminiscent of patchouli oil. It is a colorless, crystalline aromatic soluble in even dilute alcohol. It is very stable. Available in commercial quantities. The Dow Chemical Co.

CERFAK F.C.

This product is essentially a sulphonated fatty condensate, supplied in dry flake form and readily soluble in water at all temperatures. It is an excellent detergent regardless of hardness or softness of the water. For chlorine bleaching, it will hold the suds well throughout the scouring and carry through the chlorine bleach bath, having no retarding effect on the bleaching. The final result is a clear white with a soft feel. Cerfak F.C. can be used for scouring, bleaching and dyeing of all types of hosiery. It provides good penetration, level dyeing and a soft clean finish. E. F. Houghton

CORDEX

Rotproofing agent for cordage. A non-inflammable, pourable copper naphthenate solution containing 8% of copper expressed as active metal. Mixes with rope additives such as cordage oil, pine tar, seine tar, asphalts, etc. Suggested Uses: for all rope and twine applications where rotting is a factor: marine ropes, fishing lines, nets, binder and hay bailer twines, and wire cable centers. Nuodex Products Co., Inc.

CORROSION INHIBITING ZINC YELLOW METAL PAINT

Containing zinc chromate as the active ingredient, this primer has been proven by Army and Navy tests to be superior to older formulations in corrosion inhibiting properties. Since it is lighter in weight than the usual red lead primers, considerable weight is saved in shipping. Gibbs Paint Manufacturing Co. & Co.

CYCLOTENE*

An aromatic specialty used in compounding flavors for beverages, tobacco, confections, and in blending perfumes. When used with Palatone* or coumarin, the results are very gratifying. Chiefly a flavor intensifier, of special interest in maple, walnut and chocolate flavors. Available in commercial quantities. The Dow Chemical Company. (*Tradesmarks, Reg. U. S. Pat. Off.)*

D

DIXIE 5—KOSMINK

A carbon black, uncompressed or dustless (pelleted), used as a general purpose black for paints, paper coating, leather finishes, floor covering, plastics, shoe and stove polishes, mortar colors, and confectionery. The black is characterized by moderate oil absorption, ease of grinding, fine dispersibility, high color intensity and gloss; average particle diam., 19 mu; surface area, 138.3 m^2 per gram; pH, 4.0; volatile matter (7 min. at 950°C), 5.5 per cent max.; sp. gr., 1.80; bulk, uncompressed, 8-10 lbs. per cu. ft., dustless, 21-23 lbs. per cu. ft.; moisture, 3.0 per cent max.; ash, 0.04 per cent max.; residue (325 mesh screen, 0.044 mm opening), 0.1 per cent max.; electrical resistance, 50 ohms; oil absorption, 142 cc per 100 grams black; diphenyl-guanidine (DPG) adsorption, 18.2 per cent; iodine adsorption, 40.0 per cent; extract (acetone), 0.3 per cent max.; soft texture; impalpable powder; jet black color; color (lithographic #1 varnish) by nigrometer, 78.8 masstone (lithographic #1 varnish, grayest black considered as 100), 769; tint (100:1, with lithographic #1 varnish, grayest black considered as 100), 326; flow, (20 varnish : 1 black, 7 min. at 30° angle, 45°C), 16 min. United Carbon Co., Inc., Charleston, W. Va.

DOW RESIN 276

Styrene type plasticizing resin. An odorless, colorless, viscous liquid. Boiling range at 5 mm. Hg, 150-300°C., specific gravity at 60/60°C., 1.01. Available in two viscosity types: V-2, 100-200 centipoises at 60°C. and V-9, 700-1000 centipoises at 60/C. Used as hydrocarbon type plasticizers, especially recommended as components of plasticizer mixtures. Widely compatible with most film-forming polymers. Available in commercial quantities. The Dow Chemical Co.

DU PONT CCA

Cellular cellulose acetate. Merging light weight insulation against thermal temperatures and sound, and remarkable structural strength as a core material, this plastic in composition is a bubble-filled cellulose acetate. It can be bonded with ease to metal, wood, or other-plastics, and, when used as a "sandwich" layer between thin sheets of these materials, it affords a laminated structure up to five times stronger than if the equivalent thickness of the other material were used throughout. The insulating properties of CCA are virtually the same as those of cork or balsa, but because it is lighter than these materials, an equal amount of the plastic provides an insulation that is twice as effective. Among proposed uses are as a core material for luggage, aircraft wall and floor panels, sections for refrigerators and prefabricated houses, furniture and boats. E. I. du Pont de Nemours & Co.

E

EMULSION FABRIC COATING TO REPLACE NITROCELLULOSE 609-4

A resinous water emulsion, designed chiefly for coating fabrics to replace nitrocellulose lacquers. Application of this material can be made either by roller or knife coating. It dries fairly fast. The dried fabric can be plated by means of an embossing machine at a pressure of about 500 lbs. per square inch, and at a temperature of approximately 230°F. After plating, this material will form a lustrous, flexible, water- and grease-repellent film. The high solids content of this coating allows the building up of required coating thickness with many coats less than required by lacquer. Recommended for use where fire-proofing facilities or the equivalent are not installed. Various pigment dispersions can be incorporated into this emulsion in order to match desired shades. American Resinous Chemicals Corp.

EMULSIFIER L-32

Approximate pH—7.2. Contains no moisture. Has good solubility in organic solvents, vegetable and mineral oils. Jacques Wolf & Co.

EMULSIFIER L-34

This material has a pH of approximately 7. Contains no moisture and would have a better solubility than Emulsifier L-34-A in organic solvents where an anhydrous compound is necessary. Jacques Wolf & Co.

EMULSIFIER L-34-A

Approximate pH 7.5 to 7.8. Contains 4% moisture. Recommended to be used with kerosene, especially in the leather industry as a degreasing agent. Jacques Wolf & Co.

EMULSION 539-5

Low cost modified alkyd emulsion containing 45% solids. A resin modifier for synthetic and/or natural rubber latices. Yields adhesive compounds depositing tough resilient films possessing good tensile strength and aggressive adhesion. Yields adhesives of medium-heavy viscosity. Modifications are available where low viscosities are required and where a soft tack is preferred to an aggressive bite. American Resinous Chemicals Corp.

EMULSION 554-11

Resin emulsion base for adhesive manufacturers to use with neoprene latices. Equal parts by weight of 554-11 and neoprene latex yield an adhesive of medium viscosity depositing a strong, pressure-sensitive film. Viscosity suitable for application by spray, brush, and roller coater. Retains cohesive tack for several days. This product recommended for all "dry stick" operations. American Resinous Chemicals Corp.

EMULSION 555-48

Resin modified emulsion of vinyl acetate copolymers particularly designed for padding, tabbing, and general bindery cementing work; contains 46% solids. This compound deposits a tough flexible film which dries rapidly and permits quick handling. The resin in this formulation increases adhesion to the paper. Supplied ready to use by brush or may be diluted with water for spray application. American Resinous Chemicals Corp.

EMULSION 1971

Transparent, liquid, alkyd resin emulsion, odorless, non-toxic. S.G., 1.255—1.256; pH, 9—

10; weight per gallon, 8.53; solids, 66 per cent. Filler or extender for natural and synthetic latices, for use in compounding latices for porous and non-porous surfaces and to increase adhesion and tensile strength. Will adhere to glazed surfaces. Adhesive Products Corp.

ERUSTO PRE-SPOTTER

Clear, straw-colored liquid composition designed for use in dry cleaning establishments primarily for removal of ground-in soil that is not removed during the normal dry cleaning operation, particularly on articles that cannot be wet cleaned. Also used to remove perspiration, water marks, and such stains as those caused by soft drinks, food, blood, oil, lipstick, mud, paint, and shellac. Non-flammable, rinses freely, and is completely soluble in both petroleum solvents and synthetic solvents. Erusto Pre-Spotter is packed in one gallon cans or jugs. Pennsylvania Salt Manufacturing Co.

EXPERIMENTAL MONOMER X-302

A divinyl benzene-ethyl vinyl benzene mixture. Amber-colored liquid with a sharp, though not particularly unpleasant, odor. Available in experimental quantities. The Dow Chemical Co.

F

FLOUR ENRICHMENT MIXTURE, BI-CAP TYPE 80-A

An impalpable powder consisting of a uniform mixture of thiamin hydrochloride, riboflavin, niacin, sodium iron pyrophosphate, and starch. The material is expressly designed to fortify 80% extraction flour to meet enrichment standards. It has a uniform particle size, is easily dispersed, and has free-flowing properties. The mixture is light yellow in color and has a guaranteed potency (per oz.) of: Thiamin, 280 mg.; riboflavin, 220 mg.; niacin, 2000 mg.; iron, 2000 mg. Chas. Pfizer & Co.

FLOUR ENRICHMENT MIXTURE, BI-CAP TYPE 80-B

An impalpable powder consisting of a uniform mixture of thiamin hydrochloride, riboflavin, niacin, iron by hydrogen, and starch. The material is expressly designed to fortify 80% extraction flour to meet enrichment standards. It has a uniform particle size, is easily dispersed, and has free-flowing properties. The mixture is light yellow in color and has a guaranteed potency (per oz.) of: Thiamin, 280 mg.; riboflavin, 220 mg.; niacin, 2000 mg.; iron, 2000 mg. Chas. Pfizer & Co.

FLOUR ENRICHMENT MIXTURE, BI-CAP TYPE 80-C

An impalpable powder consisting of a uniform mixture of thiamin hydrochloride, riboflavin, niacin, iron by hydrogen, and starch. The material is expressly designed to fortify 80% extraction flour to meet enrichment standards. It has a uniform particle size, is easily dispersed, and has free-flowing properties. The mixture is light yellow in color and has a guaranteed potency (per oz.) of: Thiamin, 560 mg.; riboflavin, 440 mg.; niacin, 4000 mg.; iron, 4000 mg. Chas. Pfizer & Co.

448 (FOR INSECT REPELLENTS)

A mixture of approximately 70% 2-phenylcyclohexanol and 30% 2-cyclohexyl cyclohexanol. A white to light straw-colored, slightly viscous liquid. Used in insect repellent formulations. Available in limited commercial quantities. The Dow Chemical Co.

G

GALEX
(Dehydroabietic Acid)

A non-oxidizing rosin having the benzenoid nucleus, lends itself to most of the chemical reactions of aromatic compounds, such as sulfonation, nitration, Friedel-Craft reactions, etc. Made in various degrees of oxygen stability, from 50 to 100% stable; also various degrees in M. P., from 60°C. to 90°C. (B & R). Has a very low crystallization tendency, and is made in the color range from F to X on the Rosin scale. Sp. Gr., about 1.08. Soluble in ordinary organic solvents such as petroleums, alcohols, ethers, esters, benzene, carbon-tetrachloride, etc. Plasticized by castor oil, perilla oil, cotton seed oil, soya bean oil, etc., and is miscible in high concentrations with natural and synthetic resins. Suggested Uses: Adhesives of water insoluble type; extender for natural and synthetic resins; for manufacture of varnishes, ester gum, soaps, soldering fluxes, metal salts, water-proofing compounds. Manufactured by the G and A Laboratories and marketed by the National Rosin Oil & Size Co.

GARDANTHROL*

Gardanthrol, an aromatic specialty, used in the manufacture of soaps and cosmetics, is a practically colorless liquid with an odor similar to methyl phenyl carbinyl acetate, but not quite as smooth. Available in commercial quantities. The Dow Chemical Co. *(*Trademark Reg. U. S. Pat. Off.)*

GELCOTE

Gelcote, a permanent protective thermoplastic coating, with a high gloss, tough, thick, tack-free film, resistant to moisture, ravages of weather, hard handling, acids, alkali, oils, grease, and miscellaneous chemicals. Thicknesses of film from .008 to .030 can be controlled during one dip. Items such as tools or knife handles, or any other object having cylindrical form where the deposited film completely surrounds the coated object are most favorable for dipping application. Gelcote differs from conventional dipping solutions in that no drain tears are encountered, and, therefore, there is no tendency for the material to flow down the dipped object. American Resinous Chemicals Corp.

GERM-I-TOL

An antiseptic of high germicidal, fungicidal, and bacteriostatic potency. It is a surface active, cationic, bactericidal agent, chemically a quaternary ammonium compound of the dimethyl benzyl higher alkyl ammonium chloride type, concentrate. As supplied, its phenol Coefficient is approximately 166 at 20°C. against staph. aureus when tested in accordance with the Food and Drug Administration Circular No. 198. Fine Organics, Inc

GLOSS COATING FOR GLASSINE 367-10c

Transparent clear, good flexibility, good heat sealing at 275-300°F., resistant to water, water vapor, grease, oils, and alcohol. Good solvent release, lustrous gloss, resistant to general abrasion. Good fluidity; readily applicable to roller coating. Non-blocking below 125°F. American Resinous Chemicals Corp.

GLOSS COATING FOR GLASSINE 367-22

Transparent, flexible, grease-, water-, and abrasion-resistant gloss coating for plain or printed glassine. Non-peeling on glassine, non-blocking. 40% solids in alcohol. American Resinous Chemicals Corp.

GLYCOX 1300

Oil and water soluble non-ionic ester, developed especially to meet rigid Government specifications for use as a DDT emulsifier. It is dissolved in a DDT concentrate and forms a stable emulsion immediately upon mixing with soft water, hard water, and sea water. It can also be used for emulsification of other insecticide solutions. It is suggested as an additive to wetting agents for increasing emulsifying properties and for the manufacture of emulsions in the presence of electrolyte. Light yellow liquid; acid No. 4.0; maximum pH (5% aqueous solution)—5.5-6.5. Glyco Products Co., Inc.

GLYCOX 1400

Oil and water soluble non-ionic ester, recommended particularly for the production of emulsions of DDT dissolved in xylol and similar solvents. It is readily soluble in most insecticide bases. Light yellow liquid; pH (5% aqueous solution)—4.0; specific gravity—1.056. Glyco Products Co., Inc.

#998 GRIPTEX

Neoprene Latex Compound for permanently bonding leather to leather; leather to fabric; leather to rubber; rubber to fabric. Adhesive Products Corp.

H

HEAT SEAL COATING FOR CLOTH 366-21B

Heat seal coating for cloth applied from solution by knife or roll application. Water-white; transparent; excellent heat seal at 250°F.; high viscosity; excellent adhesion to fabrics; resistant to water, dilute caustic solutions, and boiling soap water. One coating sufficient to give good heat seal. American Resinous Chemicals Corp.

HORMONE SPRAY H, OIL TYPE

Clear amber oil containing 4 grams of a-Naphthaleneacetic Acid, in oil soluble form, per pint. When added to water a stable emulsion is formed. Use: pre-harvest spray for apples, particularly for airplane application. Westville Laboratories.

HOT MELT 367-13E

Low cost heat seal coating for papers, suitable for food packaging. Non-discoloring on continuous heating. Non-toxic. Resistant to grease, oils, water, water vapor. Good flexibility. Cream color. Application temperature, 325-375°F. American Resinous Chemicals Corp.

HOUGHTO-WAX

Not a replacement of any ingredient formerly used in sizing but its use to some extent is said to permit a lower concentration of starch. Houghto-Wax is added to the regular size formula in the amount of about 3 pounds to 100 pounds of starch. Size check-up tests indicate a stronger warp without decreasing elongation when Houghto-Wax is added to the size formula. This product is supplied in one-pound cakes, packed 100 to a case, convenient to use without the necessity of weighing. E. F. Houghton & Co.

HYDRITE

A hydrated aluminum silicate of controlled particle size. For use as an "extender-pigment" in water-reducible paints of the resin-emulsion type. Color, white. Specific Gravity, 2.60. Bulking factor, 0.0461 gals. Screen Fineness, 99.9% through 325 mesh (wet method). Texture soft, non-abrasive. Easily dispersed in water. High water holding capacity. Plate-like particles produce well-knit structure resistant to washability in paint film. Georgia Kaolin Co.

I

INTRACOLS

Water-soluble tan paste, effective as an emulsifier for fatty acids in solutions of Glauber's salt, calcium chloridem sodium chloride, aluminum chloride, and aluminum acetate. Cationic surface agent and emulsifier. Composition; long-chain fatty acid amide containing multiple amino groups. Synthetic Chemicals, Inc.

INTRAL 229

Wetting agent, dispersing agent, emulsifier. Viscous amber liquid, soluble in water, nonionic and neutral, active in highly active solutions. Unsaturated long-chain fatty acid ester containing multiple ether linkages. Synthetic Chemicals, Inc.

INTRAMINES

Sodium salt of sulfate lauryl and myristyl collamide, white to tan powder, soluble in water. Wetting agent, dispersing agent, emulsifier, detergent. Synthetic Chemicals, Inc.

J

JANUSOL

Mixture of lauryl and myristyl esters containing both primary amino and sulfated groups. Tan paste, water-soluble, effective as wetting agent and dispersing agent (anionic and cationic). Synthetic Chemicals, Inc.

K

KOSMOBILE—DIXIEDENSED

Carbon black, dustless (pelleted); used as HPC (hard processing channel) type for reinforcement of natural rubber and several types of synthetic rubbers for tire treads, soles, heels, conveyor belting, and miscellaneous mechanical goods; in rubber the black is characterized for relatively high power requirement in mixing, relatively high mixing temperature, hard processing, relatively slow cure, high stress strain at optimum cure, high heat generation, and excellent resistance to abrasion and tear; average particle diam., 24 mu; surface area, 105 m^2 per gram; pH, 5.6; volatile matter (7 min. at 950°C.), 5.5 per cent max.; sp. gr., 1.80; bulk, 19-23 lbs. per cu. ft.; moisture, 3.0 per cent max.; ash, 0.04 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 16 ohms; oil absorption, 139 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 16.0 per cent; iodine adsorption, 31.0 per cent; extract (acetone), 0.3 per cent max.; soft texture; impalpable powder; jet black color; color (lithographic #1 varnish) by nigrometer, 83.4; masstone (lithographic #1 varnish, grayest black considered as 100), 625; tint (100:1 with lithographic #1 varnish, grayest black considered as 100), 319. United Carbon Co., Inc.

KOSMOBILE 77—DIXIEDENSED 77

Carbon black, dustless (pelleted), used as EPC (easy processing channel) type for reinforcement of natural and all types of synthetic rubbers for tire treads, pneumatic and solid, soles, heels, conveyor belting, wire insulation, and miscellaneous mechanical goods; in rubber the black is characterized for relatively moderate power requirement in mixing, relatively low mixing temperature, easy processing, fast cure, high stress strain, good aging, low heat generation, and high resistance to tear, flex and abrasion; average particle diam., 30 mu; surface area, 80 m^2 per gram; pH, 5.3; volatile matter (7 min. at 950°C.), 6.5 per cent max.; sp. gr., 1.80; bulk, 19-23 lbs. per cu. ft.; moisture, 3.0 per cent max.; ash, 0.04 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 120 ohms; oil absorption, 135 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 11.1 per cent; iodine adsorption, 27.5 per cent; extract (acetone), 0.3 per cent max.; soft texture; impalpable powder; jet black color; color (lithographic #1 varnish) by nigrometer, 90.3; masstone (lithographic #1 varnish, grayest black considered as 100), 550; tint (100:1, with lithographic #1 varnish, grayest black considered as 100), 318. United Carbon Co., Inc.

KOSMOBILE S-66—DIXIEDENSED S-66

Carbon black, dustless (pelleted), used as MPC (medium processing channel) type for reinforcement of natural and all types of synthetic rubbers for tire treads, soles, heels, conveyor belting, wire insulation and miscellaneous mechanical goods; in rubber the black is characterized for relatively moderate power requirement in mixing, relatively low mixing temperature, medium processing, fast cure, high stress strain, and good resistance to tear, abrasion and flex; average particle diam., 28 mu; surface area, 94 m^2 per gram; pH, 4.7; volatile matter (7 min. at 950°C.), 6.0 per cent max.; sp. gr., 1.80; bulk, 19-23 lbs. per cu. ft.; moisture, 3.0 per cent max.; ash, 0.04 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 42 ohms; oil absorption, 137 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 13.3 per cent; iodine adsorption, 29.0 per cent; extract (acetone), 0.3 per cent max.; soft texture; impalpable powder; jet black color; color (lithographic #1 varnish) by nigrometer, 87.0; masstone (lithographic #1 varnish, grayest black considered as 100), 603; tint (100:1, with lithographic #1 varnish, grayest black considered as 100), 320. United Carbon Co., Inc.

KOSMOS 15 A—DIXIFLUO A

Carbon black, uncompressed, used for halftone and litho inks, typewriter ribbon, and carbon paper. The black is characterized by low oil absorption, ease of grinding, superior color, and extremely long flow; average particle diam., 17 mu; surface area, 229 m^2 per gram; pH, 2.7; volatile matter (7 min. at 950°C.), 15.0 per cent max.; sp. gr., 1.80; bulk, 8-10 lbs. per cu. ft.; moisture, 3.0 per cent max.; ash, 0.04 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 20 ohms; oil absorption, 134 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 60.9 per cent; iodine adsorption, 70.0 per cent; extract (acetone), 0.3 per cent max.; soft texture; impalable powder; jet black color; color (lithographic #1 varnish) by nigrometer, 64.5; masstone (lithographic #1 varnish, grayest black considered as 100), 782; tint (100:1, with lithographic #1 varnish, grayest black considered as 100), 299; flow (6 varnish : 1 black, 6 minutes at 30° angle, 45°C.), 120 min. United Carbon Co., Inc.

KOSMOS BB—DIXIE BB

Carbon black, uncompressed, used in plastics, synthetic resins and enamels. The black is characterized by high oil absorption, good dispersibility, fine gloss, and high color intensity; average particle diam., 16 mu; surface area, 281 m^2 per gram; pH, 4.6; volatile matter (7 min. at 950°C.), 6.0 per cent max.; sp. gr., 1.80; bulk, 8-10 lbs. per cu. ft.; moisture, 3.0 per cent max.; ash, 0.04 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 1.0 ohms; oil absorption, 162 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 65.0 per cent; iodine adsorption, 88.0 per cent; extract (acetone), 0.3 per cent max.; soft texture; impalpable powder; jet black color; color (lithographic #1 varnish) by nigrometer, 67.9; masstone (lithographic #1 varnish, grayest black considered as 100), 861; tint (100:1, with lithographic #1 varnish, grayest black considered as 100), 336. United Carbon Co., Inc.

KOSMOS 20—DIXIE 20

Carbon black dustless (pelleted), used as SRF (semi-reinforcing) type for the semi-reinforcement of natural and all types of synthetic rubbers for passenger tires and tubes, truck and bus tires and tubes, farm tractors and implement tires and tubes, industrial and truck solid tires, airplane tires and tubes, bicycle tires and tubes, camelback, bogie wheels, hose and tubing, belting, footwear, heels, wire and cable, packing and gaskets, automotive mountings, molded goods, and miscellaneous goods; in rubber the black is characterized for low power requirement in mixing, low mixing temperature, very easy processing, smooth extrusion, low stress strain, high resiliency, good aging, and very low heat generation; average particle diam., 81 mu; surface area, 29 m^2 per gram; pH, 9.4; volatile matter, (7 min. at 950°C.), 1.5 per cent max.; sp. gr., 1.80; bulk, 24.30 lbs. per cu. ft.; moisture, 1.0 per cent max.; ash, 0.5 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 1.9 ohms; oil absorption, 95 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 0.9 per cent; iodine adsorption, 8.8 per cent; extract, (acetone), 0.15 per cent max., (benzol), 0.20 per cent max.; soft texture; impalpable powder; dull slightly grayish black color; color (lithographic #1 varnish) by nigrometer, 103.0; masstone (lithographic #1 varnish, grayest black considered as 100), 163; tint (100:1, with lithogranhic #1 varnish, gravest black considered as 100), 242. United Carbon Co., Inc.

KOSMOS 40—DIXIE 40

Carbon black, dustless (pelleted), used as HMF (high modulus furnace) type for reinforcement of natural and all types of synthetic rubbers for passenger and truck tires, and tubes, industrial and truck solid tires, farm tractors and implement tires and tubes, camelback, soles, heels, belting, wire and cable; in rubber the black is characterized especially for low power requirement in mixing, low mixing temperature, easy processing, smooth extrusion, fast cure, high modulus, relatively high tensile, high resiliency, low heat generation, and good resistance to cut growth; average particle diam., 41 mu; surface area, 45 m^2 per gram; pH, 9.6; volatile matter (7 min. at 950°C.), 1.5 per cent max.; sp. gr., 1.80; bulk, 23-28 lbs. per cu. ft.; moisture, 1.0 per cent max.; ash, 0.5 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 1.2 ohms; oil absorption, 97 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 2.2 per cent; iodine adsorption, 9.6 per cent; extract (acetone), 0.08 per cent max., (benzol), 0.12 per cent max.; soft texture; impalpable powder; color (lithographic #1 varnish) by nigrometer, 101.8; masstone (lithographic #1 varnish, grayest black considered as 100), 160; tint (100:1 with lithographic #1 varnish, grayest black considered as 100), 275. United Carbon Co., Inc.

KOSMOS R—DIXIE ORDINARY

Carbon black, uncompressed, used for news ink, industrial paints, paper, and fertilizers; the black is characterized by moderate oil absorption, ease of grinding, complete dispersibility, high color intensity, and good tone qualities; average particle diam., 24 mu; surface area, 105.5 m^2 per gram; pH, 4.0; volatile matter (7 min. at 950°C.), 6.5 per cent max.; sp. gr., 1.80; bulk, 8-10 lbs. per cu. ft.; moisture, 3.0 per cent max.; ash, 0.04 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 30 ohms; oil absorption, 123 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 10.0 per cent; iodine adsorption, 20.0 per cent; extract (acetone), 0.3 per cent max.; soft texture; impalpable powder; jet black color; color (lithographic #1 varnish) by nigrometer, 81.8; masstone (lithographic #1 varnish, grayest black considered as 100), 714; tint (100:1, with lithographic #1 varnish, grayest black considered as 100), 313; flow (20 varnish : 1 black, 7 min. at 30° angle, 45°C.), 65 min. United Carbon Co., Inc.

KOSMOS VOLTEX—DIXIE VOLTEX

Carbon black (compressed) used as CC (conductive channel) type for natural and all types of synthetic rubbers, where static dissipation and good electrical conductivity are required, for tire treads, soles, heels, conveyor belting, wire insulation, and miscellaneous mechanical goods; in rubber the black is characterized for relatively high power requirement in mixing, relatively high temperature mixing, hard processing, slow cure, moderate stress strain and high electrical conductivity; average particle diam., 16 mu; surface area, 281 m^2 per gram; pH, 4.6; volatile matter (7 min. at 950°C.), 6.5 per cent max.; sp. gr., 1.80; bulk, 21-23 lbs. per cu. ft.; moisture, 3.0 per cent max.; ash, 0.04 per cent max.; residue (325 mesh screen, 0.044 mm. opening), 0.1 per cent max.; electrical resistance, 0.1 ohms; oil absorption, 180 cc per 100 grams black; di-phenyl-guanidine (DPG) adsorption, 29.8 per cent; iodine adsorption, 60.0 per cent; extract (acetone), 0.3 per cent max; soft texture; impalpable powder; highly jet black color; color (lithographic #1 varnish) by nigrometer, 68.0; masstone (lithographic #1 varnish, grayest black considered as 100), 816; tint (100:1 with lithographic #1 varnish, grayest black considered as 100), 350. United Carbon Co., Inc.

L

LIQUID ASPHALT GILBY #389

Refined asphalt gilsonite base dissolved in a closely fractionated petroleum solvent; suitable for a protective coating for automobile chassis, metal parts, wire, etc., dries 15 to 30 minutes, color black, acid and alkali resistant. Byerlyte Corp., Cleveland, Ohio.

LIQUID STRIP

Liquid Strip is a specially designed temporary protective thermoplastic coating, which is tough, flexible, non-inflammable, and resistant to moisture, ravages of weather, hard handling, acids, alkalies, oils, greases, and miscellaneous chemicals. Liquid Strip is easy to apply and easy to remove, usually peeling off in one piece. It can be formulated in practically any color. It may be sprayed or dipped, and thinners for both spray and dip application are available. Suggested uses are as a masking film eliminating the use of masking tapes, as a masking or stop-off lacquer for electro-plating purposes, as a coating for optical glass and similar precision pieces for protection during shipment, as an overseal on bottle caps, as a coating over so-called "hard" goods to protect them during shipment and display, and for goods in storage. American Resinous Chemicals Corp.

M

MERLON

Aqueous resin dispersions of approximately 40% solids derived from vinyl type compounds; suitable for surface resin finishes on textiles. Color, white. Sp. gr., 1.02-1.04. Available in commercial quantities. Monsanto Chemical Co.

M-L FLAT NO. 144

White organic flatting material designed primarily for use in alkyd or alkyd-urea pigmented enamels. Flatting efficiency is high and uniform flatting is obtained on flat or curved surfaces. Particularly advantageous in white bak-

ing enamels because of initial color and will not discolor during baking or after-yellow on aging. R-B-H Dispersions Division of Interchemical Corp.

METALCOTE

Metalcote is a system of three synthetic resin coating compositions, which is highly resistant to many of the following: acids, alkalies, sulphate, chloride, and phosphate, salt solutions, food products, wines and brandies, and organic solvents. It is tough, durable, easy to apply and repair. Suggested uses are as a lining for reaction tanks used in chemical industries, milk tank cars, gasoline tank cars, plating tanks, or as a coating for ducts, exhaust hoods, fans, valves, pipes, or wherever corrosive vapors are present. May be brushed, sprayed or dipped, and the coating compositions are sold ready for application. It can be formulated to meet color specifications. American Resinous Chemicals Corp.

MULSOR

Pale amber colored liquid emulsifying agent, stable to heat and light; neutral; soluble in all proportions in petroleum solvents. Long-chain fatty acid ester containing multiple ether linkages. Synthetic Chemicals, Inc.

MULTAMINO Z

An enzymatic hydrolysate prepared principally from casein containing about 1% sodium chloride, 11.5% total nitrogen, 5% amino nitrogen. Furnishes nutritionally complete amino acid composition for oral administration. Availability: Commercial quantities. The Edwal Laboratories, Inc.

N

NEGAMINE 142 A

Cation active surface active wetting, finishing, dispersing and emulsifier agent having free basic amino groups. Synthetic Chemicals, Inc.

NEOPRENE SATURANT 451-23A

A neoprene latex composition, especially designed for impregnation. It is compounded to vulcanize at lower temperatures, *i. e.*, 100°C. and to affect complete and thorough saturation. In view of the special physical properties of neoprene, such as chemical resistance, this compound is recommended particularly for impregnation of gasket papers and asbestos. Any desirable shade can be matched by incorporating various pigment dispersions. American Resinous Chemicals Corp.

NON-IONIC SURFACE-ACTIVE AGENT 218

A new surface-active agent characterized by: effective surface tension lowering ability; efficiency in hard water; stability in alkaline, neutral, mildly acid and boiling solutions, and when used with electrolytes; and efficiency in washing fabrics, especially wool. This new surface-active agent contains no alkali and is of interest for the washing of: household articles, greasy surfaces, walls, automobiles, waxed surfaces and fabrics of all kinds. For most applications a concentration of 0.05% to 0.1% in water is sufficient. Available in limited quantities. Sharples Chemicals, Inc.

NOPACOL* 6-L

A non-ionic fatty ester, "oxygenated" to the point where it is capable of producing clear dispersions upon dilution with water. Being non-ionic, Nopalcol 6-L, when employed as an emulsifier for various oily constituents, shows stability in the presence of various inorganic salts. Due to the lowering of the surface tension of water, solutions of Nopalcol 6-L are recommended for the even dyeing of fabrics and packaged yarns. Color—amber; pH—produces aqueous dispersions with a pH between 6 and 7; Description—liquid. National Oil Products Co. *(*Reg. U. S. Pat. Off.)*

NOPCO* FUA

A 100% anhydrous, fatty, chemical compound; contains no mineral oil or hydrocarbons; salt free and ash free; neither a sulphonate nor an alkali soap. Color—amber; moisture—nil; pH 2% solution—9.0 (approx.). Suggested Uses—Self-fulling and self scouring wool oil. National Oil Products Co. *(*Reg. U. S. Pat. Off.)*

NOPCO* PENTAL SERIES

Pentaerythritol esters. Color—11 max.; Viscosity—(approx.)—T to Z-2; Acid Value—10 max.; Specific Gravity @ 20°C.-1.02 to 1.05; Drying Time—8 to 20 hours; Resin Esters—45%; Fatty Esters—50% Sterols—Higher Alcohols—5% min. Suggested Uses—drying oil extender and replacement for paints, varnishes, and inks. National Oil Products Co. *(*Reg. U. S. Pat. Off.)*

NOPCOWET K

A sulphonated alkylated aromatic, producing clear dispersions in water at a temperature above 35°C. Following standard Draves' procedure, a 0.4% concentration in water wets out in 3 seconds. A similar wetting time obtained with a 0.4% concentration in 0.5% of a sulphuric acid solution. Moisture—50%; Description—liquid; Color—clear brown; pH—aqueous solution will range between 7.0 and 7.5. National Oil Products Co.

NOPCO* 1573

Polystyrene resin emulsion. Moisture—50%; pH of a 5% dispersion—between 8.0 and 8.5; Color and Description—fluid, milky white emulsion; Suggested Uses—for laminating paper, as an adhesive constituent, and as a fibrous sizing constituent. National Oil Products Co. *(*Reg. U. S. Pat. Off.)*

NOPCO* FZP

Sulpahted fatty amide capable of producing copious foam. The inorganic salts in its composition are such that they do not tend to crystallize under usual storage conditions. moisture—60%; Activity—slightly above 20%; Suggested Uses—active detergent in bar soaps, used as is for paste hair shampoos, with other constituents to produce modified paste shampoos or cream shampoos, as a synthetic detergent in the processing of textiles. National Oil Products Co. *(*Reg. U. S. Pat. Off.)*

NUOCIDE COPPER NH-8

Hydroxy copper naphthenate in an aqueous, ammonium solution showing marked superiority over orthodox cuprammonium treatments. Practically free of residual odor. Contains 8% copper metal. Suggested Uses: Rotproofing agent for textiles, as well as other cellulosic materials where maximum, permanent, odorless protection is needed in an originally water soluble proofing agent. Nuodex Products Co.

NUOCIDE 87

A liquid concentrate of an essentially colorless and odorless, non-irritant, organic fungicide. Soluble in both water and oils or solvents. Suggested Uses: Versatile, effective all-purpose fungicide. Base for general household mildewproofer. Useful as protection for textiles during dyeing and storage, for wet wash and laundry use, for mildewproofing wearing apparel. Nuodex Products Co.

NUOCIDE 50

An effective, non-irritant, oil and solvent soluble liquid concentrate in mineral spirits of an organic fungicide. Also available in emulsion form as NUOCIDE 59. Suggested Uses: Designed principally as a mildewproofing agent for leather. Mixes easily with fat liquor, leather treating oils, and leather dressings. Shows little tendency to discolor or contribute odor to treated materials. Also recommended for general application in the field of textile preservation. Nuodex Products Co.

NUOCIDE 59

An emulsion concentrate of the active fungicide in NUOCIDE 50 for utilizing the valuable properties of this latter compound in water systems. Suggested Uses: Leather, textile, and general mildewproofing use involving aqueous systems. Nuodex Products Co.

NUOCIDE 72

Oil and solvent soluble—yet casein dispersible—liquid organic mildewproofing agent. Suggested Uses: Mildewproofing agent and preservative for casein and other proteinaceous materials. Excellent for casein paints, leather coatings, paper coatings, adhesives and plastics. Nuodex Products Co.

NUOCIDE 63

An emulsion concentrate of the active fungicide in Nuocide 321. Produces stable emulsions with excellent mildewproofing properties. Suggested Uses: Any application where the high toxicity to molds exhibited by phenyl mercurials is needed in an aqueous treatment. Nuodex Products Co.

NUOCIDE 321

Unusually effective, easy to handle, mineral spirits solution of an aryl mercury fungicide. Virtually stainless and odorless at application concentrations. Also available in emulsion form as Nuocide 63. Suggested Uses: For superior performance wherever mercurial fungicides are now used. Fungicide for oil paints. General textile mildewproofer for non-personal fabrics. Nuodex Products Co.

NUOCIDE COPPER T-6

Oil and solvent soluble copper soap with excellent rotproofing ability. Non-irritant and low in residual odor. Suggested Uses: General rotproofing of wood and fabrics where a high degree of protection is needed in a relatively odorless treatment. Nuodex Products Co.

O

OCTOATE INK DRIERS

Octoates are the metallic salts of octoic acid, 2-ethylhexoic acid, $CH_3\ (CH2)_3\ CH\ (C_2H_5)\ COOH$. They are manufactured by precipitation, fusion or a combination of these processes. Since Octoic Acid is a purely synthetic organic fatty acid with definite regular constants it is possible to control the metallic soaps more accurately than with other available acids. These ink driers are readily employed wherever organic metallic soaps are used. As drier combinations they are generally more stable, faster acting and non-skinning. While the amounts of these materials used may be small, improvements in solubility, drying action, odor, and staining properties are of interest in ink formulation. Fred'k A. Stresen-Reuter, Inc.

O-442

Special liquid fatty acid fraction. Molecular weight approximately 279. Sp. Gr., 0.88-0.89 @ 15°/15°C. Titre, 5°C. Iodine Value, 135-140. Acid number, 187-191. Soluble in most organic solvents. Color, light straw. Odor, mild fatty. Suggested Uses: Enters all reactions normal to semi-drying fatty acids. Used for specialty, free-flowing soaps, with unusual low temperature characteristics. Emery Industries, Inc.

P

PALATONE*

Aromatic specialty used either with coumarin or cyclotene* or by itself in compounding perfumes, flavors for beverages, and in the preparation of pine needle and balsam needle oil. Chiefly a flavor intensifier of special interest when used with strawberry and raspberry type flavors. Available in commercial quantities. The Dow Chemical Co. *(*Trademarks, Reg. U. S. Pat. Off.)*

PAPER IMPREGNANT 451-26

Resin-modified, curing-type, Buna latex dispersion formulated to give rapid and complete saturation for high void paper stock and fabrics. Material impregnated with 451-26 will possess good tear and tensile strength, increased water resistance and excellent ageing characteristics. Treated stock may be coated with nitrocellulose lacquers without discoloration. American Resinous Chemicals Corp.

PAPER LAMINANT 366-3B

Designed especially as laminant for cellulose acetate to various papers. Non-stringing, colorless, good ageing characteristics, fair resistance to ultra violet light, highly resistant to water. Gives smooth application by roller coat. American Resinous Chemicals Corp.

PENCO CATTLE SPRAY

A fine, dry, free flowing powder containing 50% DDT with a wetting agent. Specially designed for use in the preparation of DDT water spray or dip for control of horn and stable flies, lice and mosquitoes on cattle, sheep, hogs, horses, and other livestock. The product contains special ingredients for wetting out hair of animals to deposit DDT and thereby maintain residual insecticidal properties. The spray may also be used as a surface residual spray on barns, hog pens and milk houses for insect control. Available in 4 pound bags and 40 and 100 pound drums. Pennsylvania Salt Manufacturing Co.

PENCO DDT SOLVENT CONCENTRATE

A concentrated solution of DDT in organic solvents for use in the preparation of finished DDT insecticide spray. The concentrate is so formulated that when it is diluted with commercial kerosene in the ratio of 7 parts of kerosene to one of concentrate, a finished 5% DDT spray will result. The concentrate, itself, is a clear, amber colored, free flowing aromatic solution, having a reasonably high flash point (115°F.). Available in one gallon bottles and 55 gallon steel drums to commercial finished insecticide spray manufacturers and large users desiring to mix their own finished DDT spray. Pennsylvania Salt Manufacturing Co.

PENCO EMULSION CONCENTRATE

Concentrated solution of DDT in organic solvents containing an emulsifying agent. Clear, amber colored, free flowing solution having a pleasant aromatic odor and reasonably high flash point (115°F.). Contains three pounds of DDT per gallon of concentrate. When mixed with water it forms a stable emulsion which may be sprayed on walls and ceilings of barns and other structures for residual control of flies and other insect life. A single application, according to direction, remains effective for several weeks. Particularly applicable where minimum visual residue on the walls is desired. Available in gallon bottles and 5 and 55 gallon steel drums. Pennsylvania Salt Manufacturing Co.

PENCO WB-50

A dry, micron-sized, wettable spray base containing 50% DDT for use in the preparation of water suspension DDT spray. Generally used at the rate of 1 to 2 pounds per 100 pounds of water, depending on local conditions. Because of the very fine particle size of Penco WB-50 and the wetting agent which it contains, it rapidly disperses in water to form a stable suspension with superior spraying characteristics. Recommended for control of many insects, such as codling moth, citrus thrips, bud worms, tent caterpillars, and leaf rollers on fruit and shade trees, Colorado potato beetles, potato flea beetle, potato aphids, cabbage worms, onion thrips and other insects. This spray can also be used on barns and other structures for residual control of insect life. Available in 4 pound bags and 40 and 100 pound drums. Pennsylvania Salt Manufacturing Co.

PENNSALT DDT EMULSION

Concentrated solution of DDT in organic solvents containing an emulsifying agent. Clear, amber colored, free flowing solution having a pleasant aromatic odor and reasonably high flash point (115°F.). Contains three pounds of DDT per gallon of concentrate. When mixed with water it forms a stable emulsion which may be sprayed on walls and ceilings of barns, milk houses and food handling and processing plants for residual control of flies and many other insects. A single application, according to direction, remains effective for several weeks. Particularly applicable where minimum visual residue on walls and ceilings is desired. Available in gallon bottles, packed 4 to the shipping case. Pennsylvania Salt Manufacturing Co.

PHENOLIC BACKING VARNISH 367-32

A flexible, protective coating for protection of metal surfaces from action of acid, alkali, water, brine, rust, abrasion and organic solvents. Good gloss, excellent adhesion to most metals. Readily applicable by dip spray or brush coating. Transparent yellow color. American Resinous Chemicals Corp.

PHILPLAST NO. I

A low cost liquid plasticizer-extender derived from petroleum recommended for use in natural rubber, GR-S, reclaim and other synthetic elastomers; possesses a powerful plasticizing action and imparts excellent original and aged tensile and elongations to vulcanizates. Recommended for carcass stocks, sponge, mechanicals and hard rubber compounds. Phillips Petroleum Co.

PHILPLAST NO. II

A highly refined, liquid plasticizer-extender manufactured from selected petroleum fractions. Philplast No. II finds use in all types of synthetic and natural rubber; it aids processing and gives vulcanizates with good abrasion resistance and low heat build-up. Recommended for tread stocks, belting and other compounds which are used in dynamic applications. Phillips Petroleum Co.

PHOSPHATE 116 C

A liquid organic phosphate which is a non-ionic surface-active agent. It gives clear water solutions. pH, 3.0 (1% conc.); Draves Test, 41.5 sec. (0.2% conc.); Density, 1.064 (25°C.). It is suggested for use as a non-foaming detergent and as a textile assistant. Victor Chemical Works.

PHOSPHATED CASTOR OIL NO. 130

A viscous yellow liquid, neutral in reaction, having a specific gravity of 1.044 at 25°, and a P_2O_5 content of 9.0 to 9.5%. Its molecular weight is about 1200. It decomposes on distillation. It is soluble in benzol, chlorinated hydrocarbons, acetone, and alcohols, and insoluble in naphtha. It forms emulsions in water. Possible uses are those of a non-ionic type of surface-active agent, as an emulsifying agent, and in the treatment of leather. Victor Chemical Works.

PLASTIC FINISH FOR VINYL SHEETING

Used for decorative purposes to give gloss finish or two-tone effect on embossed plastic sheeting. Applied clear or with dyes and pigments. May be hand swabbed or sprayed. Plastic Topping is branded 494-15D; Plastic Topping thinner is branded 494-14. American Resinous Chemicals Corp.

PLASTICIZER 3

An unsaturated fairly viscous liquid having an iodine number of about 125 and a dark amber color. Miscible with most organic solvents, but is insoluble in water. It is completely compatible with butadiene-acrylonitrile (GR-N) rubbers, butadiene-styrene (GR-S) rubbers, chloroprene (GR-M) rubbers, and natural rubber. It is compatible with most commercial softeners and plasticizers. Recommended as a sulphur-reactive plasticizer, tackifier, extender, processing aid and dispersing aid for GR-N, GR-S, GR-M, and natural rubber. Amecco Chemicals, Inc.

PLASTOLEIN AA

A product quite similar to 0-442 chemically but specially designed for manufacture and modification of alkyd resins. 0.89 to 0.91 @ 15°/15°C. Refractive Index, 1,460 @ 25°C. Titre, 3.0-5.0°C. Iodine Value, 91-95. Acid value, 195-199. Saponification number, 197-201. Unsaponifiable, 2.0%. Color, 15Y/1.5R 5¼ cell-Lovibond scale. Suggested Uses: Enters all reactions typical of Oleic Acid. Used where light color is important, alkyd resins for baking finishes, organic oleates, plasticizers, specialty soaps (pharmaceuticals), cosmetics. Available in limited commercial quantities. Emery Industries, Inc.

POLYAMYL BIPHENYL-1000

A mixture of polyamyl biphenyls. Slightly viscous, light yellow oil. Sp. gr., 0.96 @ 25°C. Refractive index, 1.564 @ 25°C. Viscosity, 56.4 SUS @ 100°F. and 38 SUS @ 210°F. Pour point, 50°F. Insoluble in water; soluble in most organic solvents. Suggested uses: Plasticizer and dielectric. Available in experimental quantities. Monsanto Chemical Co.

POLYAMYL BIPHENYL-2000

A mixture of polyamyl biphenyls. Viscous yellow oil. Sp. gr., 0.93 @ 25°C. Refractive index, 1.547 @ 25°C. Viscosity 235 SUS @ 100°F. and 43 SUS @ 210°F. Pour point, 20°F. Insoluble in water. Soluble in most organic solvents. Suggested uses: Plasticizer and dielectric. Available in experimental quantities. Monsanto Chemical Co.

POLYAMYL BIPHENYL-3500

A mixture of polyamyl biphenyls. Very viscous yellow oil. Sp. gr., 0.92 @ 25°C. Refractive index, 1.534 @ 25°C. Viscosity, 1600 SUS @ 100°F. and 71 @ 210°F. Pour point, 10°F. Insoluble in water; soluble in most organic solvents. Suggested uses: Plasticizer and dielectric. Available in experimental quantities. Monsanto Chemical Co.

POLYCHLOR COMPOUND 1945

Larvacide, with three times killing power of paradichlorbenzene, for moths, black carpet beetle, etc. Also kills larvae, and has long-lasting power. Mixed with water will not hydrolyze, with pH remaining approximately 5.3. No free chlorine released to the air. Does not affect tensile strength of wool or fur. Can be compressed into cakes or tablets, without binder. Fine Organics, Inc.

POLYETHYL BIPHENYL 2000

A mixture of polyethyl biphenyls. Slightly viscous oil. Sp. gr., 0.97 @ 25°C. Refractive index, 1.57 @ 25°C. Viscosity, 68.4 SUS @ 100°F. and 34.4 SUS @ 210°F. Pour point, −40°F. Insoluble in water; soluble in most organic solvents. Suggested uses: Plasticizer and dielectric. Available in experimental quantities. Monsanto Chemical Co.

POLYETHYL-POLYISOPROPYL BIPHENYL-2030

Mixed polyethyl-polyisopropylbiphenyl. Very viscous yellow oil. Sp. gr., 0.89 @ 65°C. Refractive index, 1.540 @ 25°C. Viscosity, 280 SUS @ 148°F. and 67 SUS @ 210°F. Pour point, 30°F. Insoluble in water. Soluble in most organic solvents. Suggested uses: Plasticizer and dielectric. Available in experimental quantities. Monsanto Chemical Co.

POLYETHYL-POLYISOPROPYL BIPHENYL-2540

Mixed polyethyl-polyisopropylbiphenyl. Very viscous yellow oil. Sp. gr., 0.87 @ 90°C. Refractive index, 1.534 @ 25°C. Viscosity, 251 SUS @ 180°F. and 120 SUS @ 210°F. Pour point, 55°F. Insoluble in water; soluble in most organic solvents. Suggested uses: Plasticizer and dielectric. Available in experimental quantities. Monsanto Chemical Co.

POLYISOPROPYL BIPHENYL-3000

A mixture of polyisopropyl biphenyls. Viscous yellow oil. Sp. gr., 0.93 @ 25°C. Refractive index, 1.550 @ 25°C. Viscosity, 220 SUS @ 100°F. and 41 SUS @ 210°F. Pour point, −5°F. Insoluble in water; soluble in most organic solvents. Suggested uses: Plasticizer and dielectric. Available in experimental quantities. Monsanto Chemical Co.

POWCO ANTU

Rodenticide, chemically alpha naphthyl thiourea. Fine greyish powder, insoluble in water, non-irritating to the skin. M. P., 183-185C. Not affected by normal temperature changes, stable in storage. John Powell & Co., Inc.

PRINTING INK FOR VINYL FILMS

Supplied in both pigment and dye types in various colors. This ink does not dry out on screen, dries within 15 minutes on vinyl sheet, provides ready flow of ink through silk screen,

possesses good opacity. It is non-powdering when dry, resistant to abrasion, and assumes flexibility of vinyl sheeting. Base formula is 366-21C; 367-33 series is of the the pigmented type; 367-34 series is of the dye type. American Resinous Chemicals Corp.

PROTEIN HYDROLYSATE

Product of enzymatic hydrolysis. Contains all essential amino acids in good balance. High nutritive value. Palatable. Very low sodium chloride content. pH of 5% aqueous suspension 5.8—6.2. Suggested uses: treatment of hyproteinemia and edema caused by inadequate protein ingestion. Useful in treatment of gastric ulcers and conditions where negative nitrogen balances are to be prevented or corrected. Provides a readily assimilated protein supplement that may be added to low protein foods, candy, and milk drinks. Publicker Industries, Inc.

PRR NO. 1

A rubber reclaiming oil which is especially adapted to the reclaiming of mixed natural-synthetic rubber scrap. It has powerful penetrating power which keeps "kettle time" down to a minimum; the reclaim possesses good tensiles and elongations. Phillips Petroleum Co.

PYRIN D 20

General purpose insecticide concentrate yielding a finished space spray containing 3 per cent improved Pyrin #20 and 1 per cent technical grade DDT when diluted at one part concentrate plus 19 parts of base oil. John Powell & Co., Inc.

PYRIN R

Insecticide concentrate for use in the manufacture of residual type DDT sprays. Standardized to give a finished spray containing 5 per cent DDT and 2 per cent of Improved Pyrin #20 when diluted at one part concentrate plus four parts base oil. John Powell & Co., Inc.

R

RESINS COATING 367-1E

Resin solution coating for all types of paper. Transparent, heat sealable, non-blocking, excellent flexibility, tough film, very good resistance to grease, oils, water, water vapor, alcohol, acids, and alkalis. Odorless and tasteless; applicable to food packaging. American Resinous Chemicals Corp.

RESIN 510

A refined hydrocarbon of natural origin; Analysis: Hydrogen, 11.00%; carbon, 87.04%; nitrogen, 0.96%; sulphur, 0.30%; ash, 0.50%; halogen, negative; phosphorus, negative; noncombustible residue, trace. Color is dark but varnish films are lighter than solution indicates and do not become progressively darker on ageing. Refractive index, 1.544; sp. gr., 1.03-1.06; acid number, 6 to 8; softening point (mercury method), 160°C. to 165°C.; iodine value (Wijs), 140 to 150. Soluble in all aromatic and aliphatic hydrocarbons. Insoluble in alcohols and esters. Compatible with oils, resins, waxes, synthetic and natural rubbers, etc. Useful in varnishes, primers, synthetic rubber cements and adhesives, etc. Possesses water and alkali resistance and has exceptionally fast solvent release. R-B-H Dispersions Division of Interchemical Corp.

RESIN 569

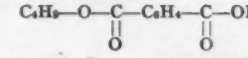
A thermosetting hydrocarbon resin solution containing 40% resin and 60% high flash naphtha. May be applied by dipping, spraying, or roller coating. Cured films are characterized by exceptional adhesion, hardness, mar resistance. Resistance to water, dilute acids, dilute alkalies, steam sterilization, moisture vapor penetration, salt spray, most chemicals and solvents is unique. Films air dry to touch within ten (10) minutes but must be baked to overcome wrinkling and attain maximum resistance. R-B-H Dispersions Division of Interchemical Corp.

RINSYNOL PD

An alkyl aryl sulfonate detergent and wetting agent in powdered form, suitable for household and industrial use; available in experimental quantity. Alrose Chemical Co.

S

SANTICIZER 160



$C_4H_9—O—\overset{\overset{O}{\|}}{C}—C_6H_4—\overset{\overset{O}{\|}}{C}—OH_2C—C_6H_5$. Mol. wt., 312. Sp. gr., 1.12 at 25°/25°C. Refractive index, 1.54 at 25°C. Boiling point, 370°C. at 760 mm. Water solubility, 0.0003% at 30°C. Suggested uses: Plasticizer for polyvinyl chloride, and nitrocellulose. Available in commercial quantities. Monsanto Chemical Co.

SANTOLITE H

Aryl sulfonamide — formaldehyde condensation resin. A clear, hard, brittle, nearly colorless resin. Refractive index, 1.430 at 25°C. Suggested uses: In lacquers makes films that are clear, colorless and of good adhesion. Decreases water permeability. Available in commercial quantities. Monsanto Chemical Co.

SANTOLITE K-5-H

Clear, light, sticky resin. Suggested use: In lacquers. Increases adhesion and decreases water permeability. Available in commercial quantities. Monsanto Chemical Co.

SANTOLUBE 31

Phosphite ester of alkylated phenol. Color, light tan to brown viscous liquid or crystalline mass. Sp. gr., 1.01-1.07 at 60/60°F. Suggested use: Bearing corrosion inhibitor in oils. Available in commercial quantities. Monsanto Chemical Co.

SANTOLUBE 204

Sp. gr., approx. 0.97 at 60/60°C. Color, dark viscous liquid. Suggested use: A blended detergent to be used as a corrosion inhibitor for heavy duty oils. Available in commercial quantities. Monsanto Chemical Co.

SANTOLUBE 205

Sp. gr., approx. 0.97 at 60/60°C. Color, dark viscous liquid. Suggested use: A blended detergent to be used as corrosion inhibitor for medium and heavy duty oils. Available in commercial quantities. Monsanto Chemical Co.

SANTOLUBE 203A

Sp. gr., 0.96. S.U.S. viscosity, 65 at 210°F. This product will pour somewhat readily at room temperature. Suggested use: In fully detergent heavy duty crankcase oils with suitable base stocks. Available in commercial quantities. Monsanto Chemical Co.

SANTOLUBE 303-A

Sp. gr., 0.941 at 60/60°F. Viscosity 100 S.U.S. at 210°F. Pour point, +5°C. Flash point, 410°F. Suggested use: As a detergent and dispersing agent to be added to crankcase lubricants to effect suspension of all contaminants. Available in commercial quantities. Monsanto Chemical Co.

SANTOLUBE 394-C

S.U.S. viscosity 145 at 210°F. Sp. gr., 1.03. Color, amber viscous liquid. Suggested use: Inhibits sludge formation, bearing corrosion, acid formation. Available in commercial quantities. Monsanto Chemical Co.

SANTOLUBE 570-X-4

Sp. gr., approx. 0.956 at 60/60°F. Flash point, 360°F. Min. viscosity, approx. 75-85 S.U.S., at 210°F. Suggested use: Pour depressant, anti-foaming agent. An improved antioxidant and bearing corrosion inhibitor. Available in commercial quantities. Monsanto Chemical Co.

SANTOMERSE 43

N-Butyl amine salt of dodecylbenzene sulfonic acid. Dark, tan-colored viscous liquid. pH of 2% solution, 8-9. Soluble in water, oil and alcohols. Suggested uses: Detergents, wetting agent and oil additive. Available in pilot plant quantities. Monsanto Chemical Co.

SANTOMERSE 53

N-Amyl amine salt of dodecylbenzene sulfonic acid. Dark, amber-colored viscous liquid. pH of 2% solution, 8-9. Soluble in water, oil and alcohols. Suggested uses: Detergents, wetting agent and oil additive. Available in pilot plant quantities. Monsanto Chemical Co.

SANTOMERSE OS

Cyclohexylamine salt of dodecylbenzene sulfonic acid. Dark, amber-colored viscous liquid. pH of 2% solution, 8-9. Soluble in water, oil and alcohols. Suggested uses: Detergents, wetting agent and oil additive. Available in pilot plant quantities. Monsanto Chemical Co.

SANTOPOID R

Gravity, °A.P.I. 7.8. Flash point, °F. 340. Fire point, °F. 400. Pour point, °F. 60. S.U.S. viscosity, 142 at 210°F. Suggested use: In hypoid and spiral bevel gear lubricants. Available in commercial quantities. Monsanto Chemical Co.

SANTOPOID S AND SRI

Sp. gr., 1.15-1.20 at 25/15.6°C. Flash point, °F. 250 min. Pour point, °F. below −35. Suggested uses: Extreme pressure gear lubricants. The SRI contains an effective rust inhibitor. Available in commercial quantities. Monsanto Chemical Co.

SANTOPOUR B

Gravity, °A.P.I. 28.5. Flash point, °F. 400. Pour point, °F. 0. Color, 5 NPA. Suggested use: A stable pour point depressant for use in high and low viscosity oils. Available in commercial quantities. Monsanto Chemical Co.

SARAN F-120 RESIN

Produces extremely dense, impervious coatings, completely waterproof and more moisture-vaporproof than any other organic coating. Coatings based on this new resin are further characterized by a high degree of resistance to solvents, oils, greases, acids and alkalies. They will not support combustion; are odorless, tasteless, and nontoxic; and can be produced with varying degrees of flexibility and hardness. Used in packaging, lacquer, corrosion- resistant paint, artificial leather, electro-plating, adhesive, textile, and leather industries. Available in commercial quantities. The Dow Chemical Co.

SARAN F-122 LATEX

A neutral colloidal suspension of a vinylidene chloride copolymer in water. It resembles rubber latex in appearance and contains approximately 56% solids by weight. It is unique in that when properly plasticized it will deposit continuous films upon simple air drying. No critical drying schedules or fusing temperatures are necessary. The inherent resistance of Saran to water, greases, oils and a large variety of solvents and chemicals has been preserved in this latex form, thereby permitting a wide variety of uses. These include protective and decorative coatings for wood, metal, paper, cloth and leather, as fiber impregnating binders, and as bases for adhesives. Available in commercial quantities. The Dow Chemical Co.

SELLOGEN O-141

Emulsifier for DDT in combination with Xylol. Jacques Wolf & Co.

SOFTEX A.P.

Cationic softener. Available as a jelly-like paste soluble in all proportions in water and having a pH working range of 3 to 8. It has been found applicable in solutions containing acid and neutral salts where ordinary softeners cannot be used. E. F. Houghton & Co.

SOLTROL

A low odor highly refined paraffinic solvent suitable as a cleaner's naphtha, paint solvent,

or chemical intermediate for chlorination and related purposes. Soltrol-100 (120°F. flash) and Soltrol-140 (140°F. flash) are available. Phillips Petroleum Co.

STIX #473

Adhesive made from synthetic rubber and plastics. Suitable for adhering plastic, fabric, metal, paper, rubber, glass, wood, cork, leatherette, sponge rubber, tinfoil, plywood, leather. Adhesive Products Corp.

STYRENE EMULSION 350-50

Used as a dryer for tacky emulsions, particularly leather finish and coating emulsions; has extremely fine particle size, is solvent-free and deposits a powdery film. Contains 30% solids and less than 0.1% unpolymerized monomer. When suitably plasticized, can be used as an adhesive or protective coating depositing a continuous film on drying. American Resinous Chemicals Corp.

SURFAX "S"

A one-piece product which serves as a combined softener and sanforizing agent for many applications. It is a combination of saponifiable and unsaponifiable oils soluble in all proportions in water and has been found applicable for the finishing of heavy cotton fabrics, such as denims or coverts where an oil softener to produce proper feel and finish, plus a rewetting agent, have been used. It is also being found useful in the finishing of knitted fabrics, such as underwear cloth, which requires a soft feel and, at the same time, must be absorbent. Surfax "S" may be used in any bath having a pH above 7 and is compatible with the ordinary materials used in finishing. It is non-oxidizing; fabrics treated with it will not discolor nor develop disagreeable odor when stored. E. F. Houghton & Co.

SURE-CURE

Compound for curing concrete roads, floors, walls, culverts. May be sprayed or applied by hand, to reduce crazing, shrinking, cracking. Reardon Industries.

SYLVENOL*

Sylvenol, an aromatic specialty used in the blending of perfumes, of ketonic nature with unusual characteristics. It is a rather viscous liquid of amber color. Its odor is definitely of the precious wood type, somewhat imitative of sandal wood, cedar wood, patchouli and vetiver, having some of the characteristics of each of those oils. Available in commercial quantities. The Dow Chemical Co. *(*Trademark Reg. U. S. Pat. Off.)*

SYNTERGENT* K (U. S. Pat. Re. 21,530)

Synthetic detergent and wetting agent. Completely void of inorganic salts. Possesses activity of 30%. 2% dispersible and stable in 5% sulfuric acid solutions and in 4% sodium hydroxide solutions. Color and description—homogeneous, clear, light amber viscous liquid; Suggested Uses—textile scouring agents, textile dyeing assistant, processing waxed paper broke, scouring papermakers' felts. National Oil Products Co. *(*Reg. U. S. Pat. Off.)*

SYNTHETIC VEGETABLE WAX #6

A pure refined product used as a carnauba wax substitute. Acid number, 1.1; ester number, 176.3; saponification number, 177.4; melting point (A.S.T.M. Petrolatum Test), 86.8°C.; melting point (Capillary Tube), 87.1; A.S.T.M. needle penetration @ 77-100-5, 6.; viscosity @ 210°F., 132.0 seconds. Wm. Diehl & Co.

T

TEFLON

Tetrafluorethylene resin. Withstands acids which dissolve even gold and platinum and offers the greatest chemical inertness of any thermoplastic. Combines the remarkably high service temperature of 500°-550°F. (the highest of any known organic material) and outstanding dielectric strength (1500 volts per mil) plus a very low power factor with toughness, negligible water absorption, and good impact resistance. Available for experimental purposes in limited amounts in the forms of sheets, rods, tubes, coated wire, tape, and fabricated sections. Its present small quantity production restricts its immediate use to those fields which place the most exacting demands on its unusual properties. Among these uses are pump gaskets and wire insulation, conduits which resist corrosive attacks, distillation equipment, tubing and piping for chemical plants, and the like. E. I. du Pont de Nemours & Co., Inc.

TENSOL

Properties: Tan paste. Soluble in water. Unaffected by hard water, mineral acids, organic acids, caustic alkalies, and bleaching and mordanting agents. Uses: Wettable sulphur and textile industries. Composition: A sulfonated alkylnaphthalene ether. Class: Wetting agent, dispersing agent, emulsifier. Synthetic Chemicals, Inc.

"TERGITOL" WETTING AGENT E H

Specific gravity at 20/20°C., 1.1146. Weight per gal. at 20°C., 9.27 lbs. New wetting and penetrating compound designed for use in high concentrations of dissolved electrolytes. Most efficient in the concentration range of 20-30% dissolved inorganic acid, base, or salt. Suggested uses: mercerization of cotton yarn, electroplating and anodizing solutions, in concentrated metal cleaning and rust removing compounds, in stone and ceramic acid cleaners, and in certain types of cosmetic preparations. Available in drum quantities. Carbide and Carbon Chemicals Corporation.

TEXTILE SIZING RESIN EMULSIONS 55-43

Aqueous dispersion of processed alkyd which can be diluted with water in any proportion, may be used to impart permanent finish to fabrics, such as cotton lustrous viscose rayon and dull viscose rayon (pigmented), especially where full-bodied handle is preferred. May be applied by padding, coating, spraying, brushing, or impregnating. May be used per se but is co-used generally with starches and dextrines for which it acts as a good binder. American Resinous Chemicals Corp.

TEXTILE BASE EMULSION 460-24

Used by compounders of textile finishes, these emulsions impart a full, soft hand, when used as a nylon, silk, or rayon size. Possess excellent laundering resistance. Impart snag resistance to sheer hosiery. Supplied at 55-60% solids. Customary practice is to process hosiery with approximately 3 parts dry resin solids and 3000 parts water per 100 parts hosiery. Blended with starched and dextrines to serve as binders, modifiers and extenders. American Resinous Chemicals Corp.

TROPICALIZED WAXES

Series of waxes of varying melting points, coefficients of expansion and contraction and flexibility, produced from amorphous aliphatic hydrocarbons highly refined and compounded with mercury or phenol derivatives, all tested for fungus inhibiting properties. Melting points from 120°F. (49°C.) to 250°F. (121°C.). Zophar Mills, Inc.

V

VINYL COPOLYMER EMULSION 397-24

Durable, colorless, flexible, thermoplastic films can be obtained from vinyl copolymer emulsions with heat sealing, stiffening and protective characteristics. Used in adhesive, impregnation and coating fields. Can be applied for bonding variety of materials, such as metal, mica, cloth, cork, leather, paper, cardboard, cellophane, wool, and certain types of plastic sheet and film. Also effective binder for pigments, wood flour, and leather scrap. Impregnation with these emulsions improve wet strength, grease-proofing qualities, and abrasion resistance of paper and cardboard. Felt, straw, silk, rayon, nylon, and cotton fabrics can be stiffened and permanently sized. Plasticized films are glossy, flexible, and durable, and can be used as decorative and protective coatings on wood, cloth, leather, paper and metal. These emulsions can be applied by swabbing, brushing, dipping, spraying, knife or roller coating, and vacuum impregnation. Stable over wide ranges of temperature and pH, and tolerate presence of many inorganic salts and strong organic and inorganic acids without coagulating. May be plasticized by direct addition of an active plasticizer or plasticizer emulsion and can be further modified by the admixture of materials such as polyvinyl alcohol, starches, dextrines and glues. Can fully replace glue for most applications. Base for compounding padding and bookbindery adhesives. American Resinous Chemicals Corp.

VINYSOL

Organosol dispersion of "Vinylite" resins. Deposit tough, flexible, abrasion resistant, water- and grease-proof film. Can be applied to cloth or paper by knife, roller coating or spray. Vinysols will give heavier coatings in fewer applications than can be obtained with solution coatings. Solids contents range between 60-78%, depending upon formulation and viscosity desired. Require heat of 325-350°F. for fusing. American Resinous Chemicals Corp.

VULTAC NO. 1

Alkyl phenol monosulfide. Sp. gr. at 25°/25°C., 1.11-1.12. Softening point, (ASTM E28-36T) 45-55°C. Sulfur content, 13%. Soft, brown resin, readily soluble in all common organic solvents. Uses: Vulcanizing agents for butadiene copolymer synthetic rubbers. Available in commercial quantities. Sharples Chemicals, Inc.

VULTAC NO. 2

Alkyl phenol disulfide. Sp. gr. at 25°/25°C., 1.16-1.17. Softening pt., (ASTM E28-36T), 55-65°C. Sulfur content, 23%. Hard, brown resin, readily soluble in organic solvents except alcohols. Uses: Vulcanizing agent for butadiene copolymer synthetic rubbers. Available in commercial quantities. Sharples Chemicals, Inc.

VULTAC NO. 3

Alkyl phenol disulfide. Sp. gr. at 25°/25°C., 1.19-1.20. Softening pt. (ASTM E28-36T), 70-80°C. Sulfur content, 28%. Hard, brown resin, readily soluble in organic solvents except alcohols. Uses: Vulcanizing agent for butadiene copolymer synthetic rubbers. Available in commercial quantities. Sharples Chemicals, Inc.

W

WATER SOLUBLE CHROMIUM COMPLEX

A complex chromium compound of the Werner type, stearato chromic chloride, in isopropyl alcohol. This product, G-1050A, is water soluble in all proportions and, in dilute aqueous solutions, yields a cationic, basic complex which combines with cellulosic and siliceous materials to form, on drying, an insoluble, hydrophobic film, resistant to steam and to dilute acids and alkalis. Combining similarly with starch, other water soluble adhesives and related materials G-1050A has an insolubilizing effect, improving water resistance and retarding redispersal. Grasselli Chemicals Dept., E. I. du Pont de Nemours & Co.

WAX CE-27

Hard synthetic wax, useful as a carnauba extender in emulsion polishes, floor polish and shoe polish. M.P. 212°F., penetration: 1; color: light yellow; acid number: 34-40. The Beacon Co.

X

X-548

A complex fatty acid ester. Specific gravity, 0.97-0.98 @ 15°/15°C. Viscosity, 75 cp @ 25°C. Solubility—cf suggested uses. Saponification number, 300-310. Acid number, 50-55. Iodine Value, 15-20. Odor, mild fatty. Color, light yellow. Suggested uses: As a plasticizer. Compatible with GRN, nitrocellulose, ethyl cellulose and polyvinyl butyral and in a limited way with polyvinyl chloride and the acetate copolymer. Emery Industries, Inc.

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City Chemical Corp.
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New York 11, N. Y.

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Heyden Parasepts are neutral esters of parahydroxybenzoic acid in fine white powder form. They are available for commercial use in pure and in technical grades of *Methyl*, *Ethyl*, *Propyl*, *Benzyl* and *Butyl* Parasepts.

Technical Data Sheets and other informative literature will be sent on request.

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Up to 250°F in GLASS PIPE...

PYREX brand Glass Pipe will withstand operating temperatures as high as 250° F and temperatures up to 400° F can be considered. Furthermore, PYREX brand glass has remarkable ability to withstand sudden temperature changes.

Its resistance to thermal shock makes it possible to flush Pyrex Pipe Lines with live steam immediately followed by cold water—a procedure often followed as a cleaning process. It is one of many reasons which make *PYREX Pipe practical plant equipment.*

It is the only pipe that possesses the combined advantages of corrosion resistance, visibility and purity maintenance. Its sturdiness and serviceability have been thoroughly proved by miles of pipe lines that have been in plant service for many years. You can install it with confidence.

Pyrex Pipe Characteristics

VISIBILITY. The crystal clear transparency of PYREX Pipe permits visual inspection of every foot of your pipe line at any time. This feature serves to forewarn you of unexpected trouble in your pipe lines.

MAINTAINING PRODUCT PURITY. PYREX Pipe is resistant to all acids (except H.F.) and moderate alkalis. There is no heavy metal pick-up or danger of metallic contamination. PYREX Pipe lines assure the ultimate in obtaining product purity.

EASE OF INSTALLATION. Your own men can install a PYREX Glass Pipe Line. No special tools or special training are required. The Pipe, the fittings and the hardware come to your installation point ready for assembly. Stock adaptor flanges are available to connect PYREX Pipe to metal pipe and other plant equipment.

SIZES AND FITTINGS. PYREX Glass Pipe is now available in 1″, 1½″, 2″, 3″, and 4″. A complete line of standard PYREX fittings includes ells, tees, return bends, laterals and reducers. Special fittings can be readily made to your specifications.

Standard fittings and adaptor connections are available to connect PYREX Pipe to your present equipment.

LOW COST. The initial cost of PYREX Pipe (accessories included) is about the same or less than the cost of full weight copper or brass piping in comparable sizes, and is considerably less than the cost of most other corrosion resistant alloys. Whether you figure costs of new equipment in terms of initial outlay or in terms of overall costs—spread over the length of service it will give you—PYREX Pipe is your best bet.

OPERATING PRESSURES. Most installations operate at pressures up to 50 p.s.i.—but pressures as high as 100 p.s.i. can be considered.

Corning Engineers will gladly furnish you with complete details. Write to Industrial Sales Department CI-8.

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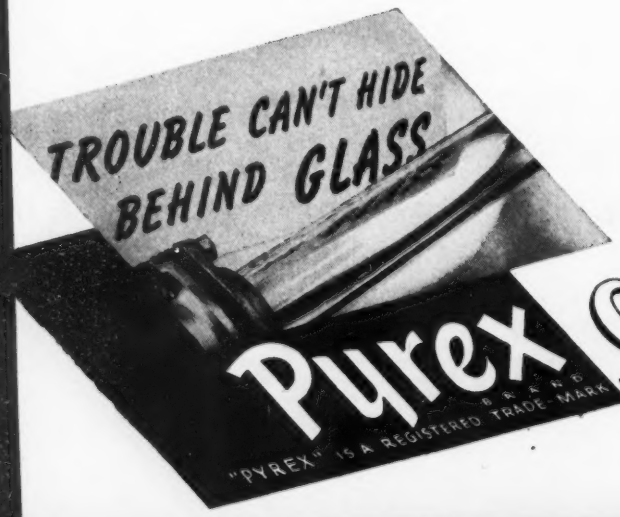
CORNING, NEW YORK



GLASS PIPE

AND INDICATES MANUFACTURE BY CORNING GLASS WORKS, CORNING, NEW YORK

INDUSTRIAL SALES DEPT., CI-8
Corning Glass Works, Corning, New York

Please send me IA-1 "*PYREX PIPE*" for the Process Industry

Name..... Title.....

Firm.....

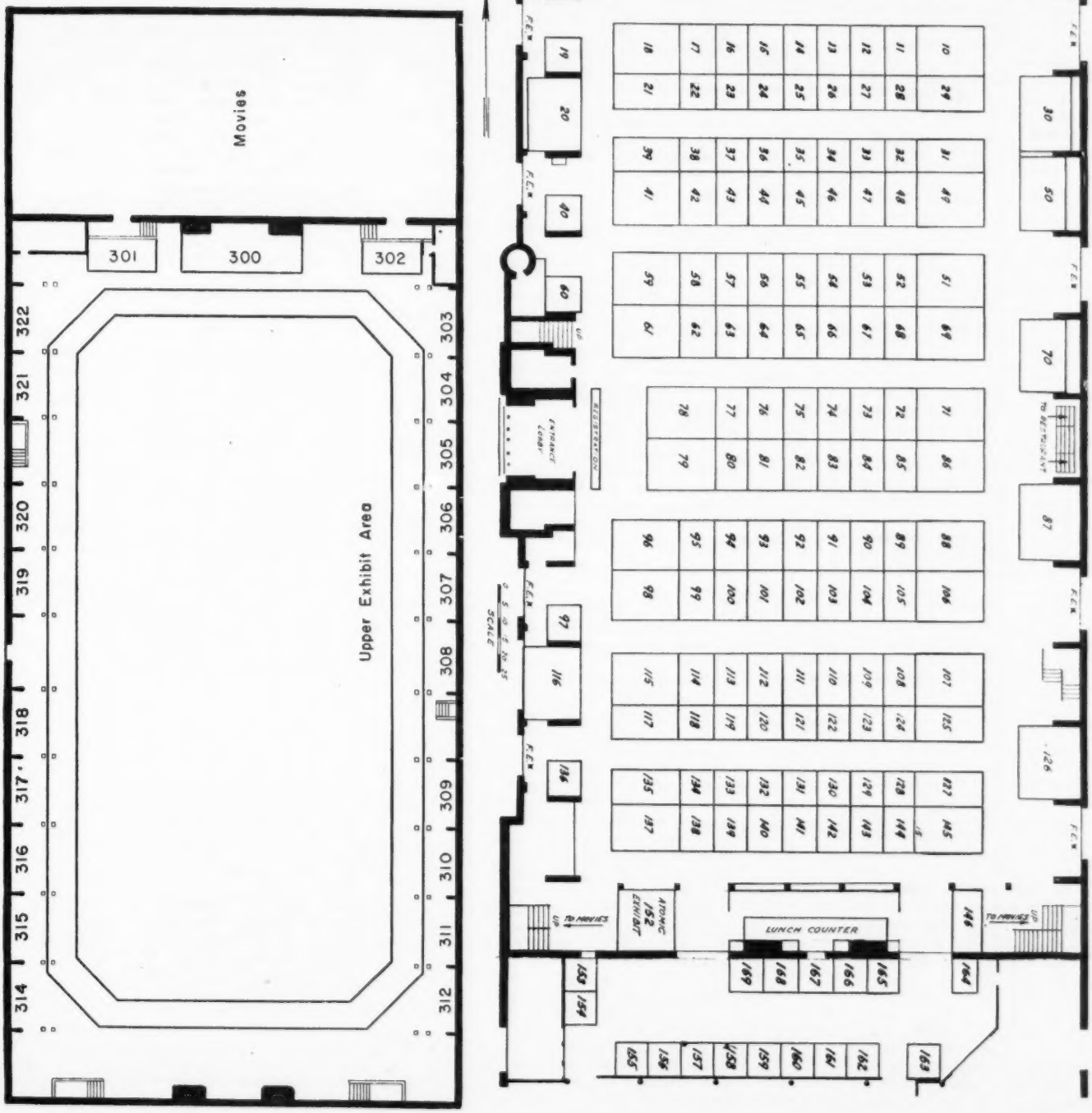
Address.....

Floor Plan

NATIONAL CHEMICAL EXPOSITION

Chicago Coliseum
Chicago, Ill.

Sept. 10-14



DIRECTORY OF EXHIBITORS

NATIONAL CHEMICAL EXPOSITION

Chicago Coliseum, September 10-14, 1946

An innovation this year is the naming by exhibitors of hosts, who will be at the booths to welcome visitors and answer questions. The hosts' names follow the company names in the following listing.

N

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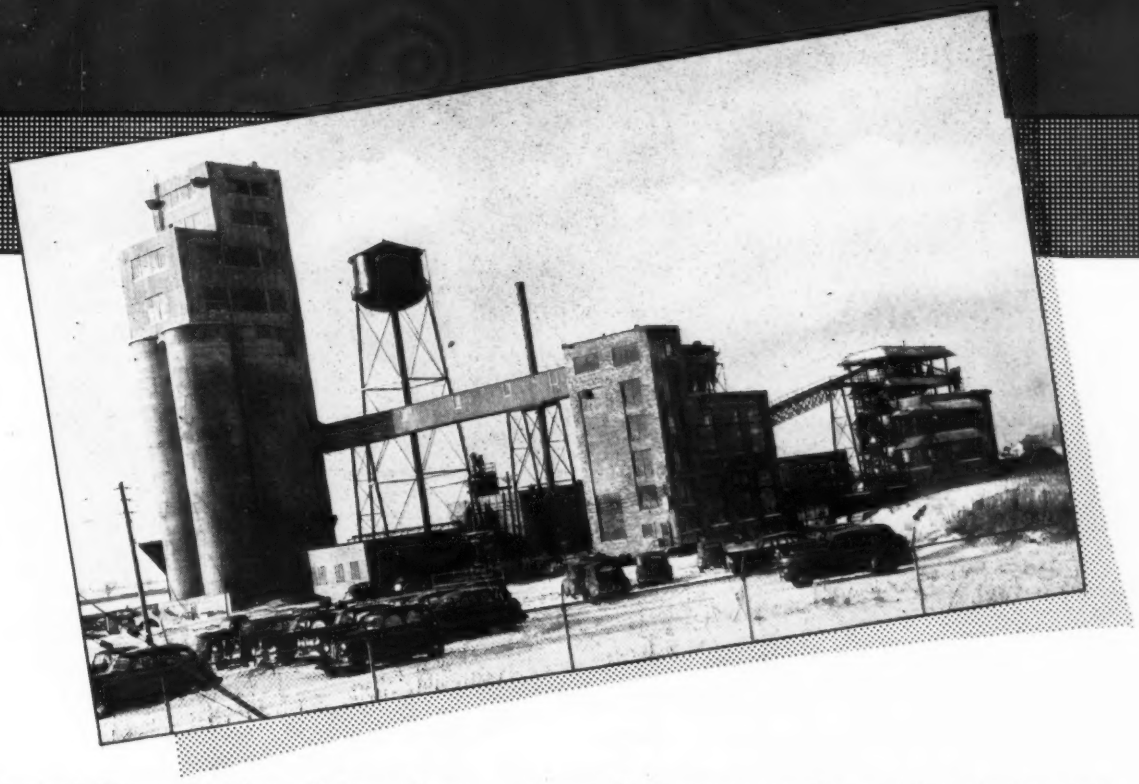
WE PLAN WITH YOU... WE BUILD FOR YOU



THE Chemical Plants Division of Blaw-Knox Company is a self contained engineering and construction force of several hundred engineers and other professional workers. These men specialize in the design and construction of complete plants for the chemical industries.

This organization, which has designed and erected over one hundred million dollars worth of process plants, is ready to work for you. You can leave everything in their hands, as they are prepared to assume responsibility and to carry through to completion.

A qualified representative will be glad to call on request and to explain to you, step by step, how the organization functions and how your new plant, extensions and implementation can be completed to your satisfaction.

BLAW-KNOX DIVISION
of Blaw-Knox Company
2093 Farmers Bank Bldg., Pittsburgh 22, Penna.
New York • Chicago • Philadelphia • Birmingham
Washington

Seven Blaw-Knox plants have been awarded the Army-Navy "E", and have regularly received renewal stars for continued high achievement in the production of war materiel.

BLAW-KNOX *IMPLEMENTS THE* **PROCESS INDUSTRIES**

NEW EQUIPMENT

Expendable Pallet QC 906

Greater economies in shipping are forecast for manufacturers using the new low-cost "X-P" expendable pallet—patent

pending—(adapted to fork-lift trucks) now being offered by Techtmann Industries.

The cost of "X-P" expendable pallets is so low that they can be discarded after a single trip. A 60% reduction in weight is achieved in this 4-way pallet by the use of double corrugated board top supported on square or round wooden blocks. Entire top and block ends are dipped in a water-resistant adhesive which seals off moisture from the load.

4,000-lb. loads have been carried on the "X-P" pallet without failure. Tests further show that this pallet will survive a number of trips without appreciable damage under normal conditions of shipment by rail or truck. Maximum load stowage is attained in the standard 42x48 inch size, since multiples of these dimensions nearly equal the widths of truck and box car bodies. Other sizes and double faced pallets are available with block spacing to suit users' lift equipment.

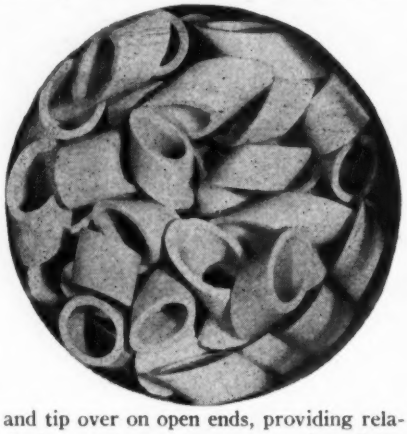
Over 1,300 empty pallets weighing approximately 30,000 lbs. can be nested in a 50-ft. box car.

Stainless Steel Channels QC 907

The Joslyn Mfg. and Supply Co. announces the addition of stainless steel channels to its regular lines of stainless steel shapes. The channels are produced hot-rolled, annealed and pickled in A. I. S. I. Types 302, 304 and 316. Sizes are from ¾" x ⅜" x ⅛" to 2½" x ⅝" x ¼" in any length desired.

Packing QC 908

Frischer rings are a filling body, cut at an angle, which overcome the inherent deficiencies of other packings. When Frischer Rings are laid with axis horizontal they maintain an unstable equilibrium



and tip over on open ends, providing relatively unobtsructed passage for fluids through all parts of the filled space. Report shows that improvement in performance of Frischer Rings over conventional rings varies from 20 to 25 per cent throughout the range which would be used in commercial practice. Laboratory tests further indicate that columns packed with Frischer Rings may be made with equal efficiency and correspondingly shorter length than those packed with other rings of the same size. In addition, it is stated that Frischer Rings, by showing greater efficiency in a shorter column, lower power cost for blowers. They are manufactured by General Ceramics and Steatite Corp.

Silver Brazing Alloys QC 909

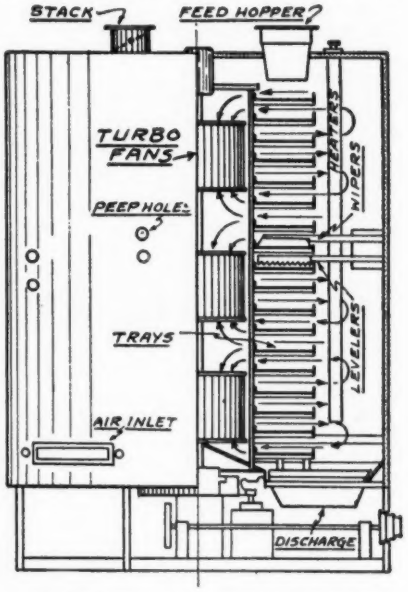
Two new silver brazing alloys, featuring lower silver content, have been announced by Handy & Harman. The new alloys are called Easy-Flo 45 and Easy-Flo 35.

As its name implies, Easy-Flo 45 is a 45% silver alloy plus copper, zinc and cadmium. One of its exceptional features is a new low melting range, 1120°F. to 1145°F. The joints produced between ferrous, non-ferrous and dissimilar metals are stroug, ductile, leak-tight. It offers the full advantages of alloys with a higher silver content but due to less silver in its composition provides an economy to help offset the increase in the price of silver.

The 35% alloy has characteristics quite different from Easy-Flo 45. It has wider melting range, 1115°F. to 1295°F.—and is free flowing at an exceptionally low temperature for an alloy containing 35% silver.

Dryer QC 910

The Wyssmont Co. announces two new standard models of their turbo dryer for continuous operation which can be used either experimentally, for pilot plant operation or actual production when the capacity requirements range between 2000



to 10,000 lbs. of dried material per day.

These units are suitable for handling a variety of materials ranging from granular material to pastes and thick slurries. ·se of its dustless operation, it is suitable for materials which dry to a fine powder. It is also recommended for materials which are inclined to cake during drying.

In these small space saving units which are only 6 feet in diameter and 6 feet and 8 feet high, for the 12 shelf and 18 shelf unit respectively, all features have been incorporated which have made the larger Turbo units so successful. Continuous drying is obtained by repeated transfer

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

CHEMICAL INDUSTRIES, 522 Fifth Ave., New York 18, N. Y. (8-6)
Please send me more detailed information on the following new equipı

QC 906	QC 910	QC 914	QC 918	QC 922	QC 926
QC 907	QC 911	QC 915	QC 919	QC 923	QC 927
QC 908	QC 912	QC 916	QC 920	QC 924	
QC 909	QC 913	QC 917	QC 921	QC 925	

Name .....

Company .....

Street .....

City & State .....

NEW KIDDE PORTABLE (model 2½) packs MORE fire-fighting punch... weighs LESS!

New unit holds 2½ pounds of carbon dioxide, compared to 2 pounds for old model . . .

CAPACITY INCREASED 25%!

New model weighs only 8¾ pounds compared to 11 pounds for old model . . .

WEIGHT REDUCED 21.5%!

—ANOTHER KIDDE "FIRE-FIGHTING FIRST"

The fast fire-killing action of carbon dioxide . . . the simple, time-proved advantages of trigger control . . . are now incorporated in a *new* portable extinguisher—the Kidde Model 2½.

Replacing the popular Model 2, this new portable packs 25% *more* fire-fighting power—yet weighs 2¼ pounds less, is easier to handle. The Model 2½ is ideal for smothering small fires in flammable liquids or electrical equipment. Use it in laboratories and other small-hazard areas. No special training needed to operate—just aim at the fire and pull the trigger!

Write today for the full facts on the Model 2½.

Walter Kidde & Company, Inc., 827 Main Street, Belleville 9, New Jersey

Kidde

The word "Kidde" and the Kidde seal are trade-marks of Walter Kidde & Company, Inc.

Kidde

and spreading of the material during its travel from top to bottom. The material dries in a uniformly thick layer for a full revolution on each successive tray. As the material is gently wiped from each tray, turning is accomplished as it falls from tray to tray forming piles which are spread and leveled, thus exposing new surfaces to the drying current with each transfer.

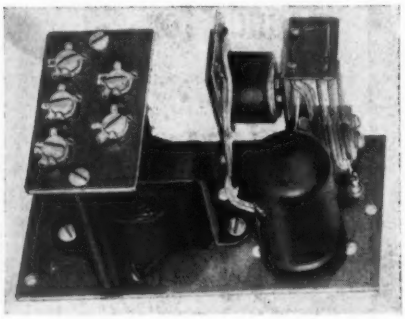
The central fan system provides internal reheating and recirculation which are prerequisites for high thermal and high fan power efficiencies. Both parallel and counter flow air circulation may be obtained.

The drying time and air velocity are variable to suit particular requirements, the former ranging from 20 minutes to 3 hours.

The standard units are offered with the tray system of steel and transite, aluminum or stainless. Both fin type and smooth surface steam heating elements are available. Electrical heaters can also be supplied.

Electronic Relay QC 911

An electronic relay, the hot-cathode Thyraton of Automatic Temperature Control Co., may be used in electrical control circuits with advantage over vacuum tube and cold-cathode devices. Its



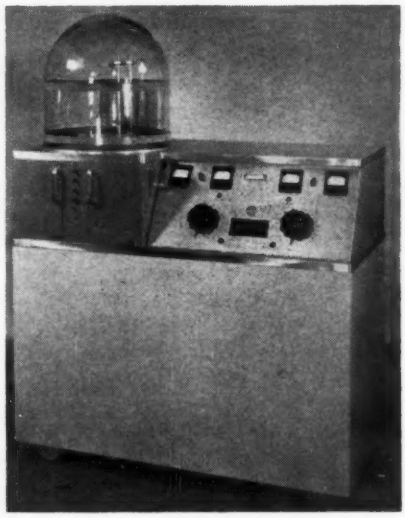
principal characteristics, which fulfill the requirements for ultra-sensitive relaying members, are (1) snap action, (2) high load contact capacity, and (3) tripping either by an external circuit carrying only three microamperes or any external circuit which drops to one megohm of pure resistance.

Operation is from standard 110 volt, 60 cycle lines. Although designed for unenclosed mounting, general purpose as well as dust-tight enclosures for housing the relay are available.

Vacuum Unit QC 912

The EMV-1 vacuum unit of the Radio Corporation of America consists of a vacuum chamber (bell jar) with a high speed pumping unit for evacuation. The pumping system and valving used in the EMV-1 are the same as those used in the EMU microscope. A mechanical fore pump and an oil diffusion pump serve to evacuate the vacuum chamber. A valving mechanism permits most of the air in the vacuum chamber to be removed without drawing the air through the diffusion pump. After a pressure of about 100 microns has been reached, the diffusion pump is connected to the system and reduces the pressure to about 0.5 to 0.1 micron.

Two different size bell jars may be used. They are 18″ in diameter and either 18″ or 29″ high. The bell jar is



lifted and lowered into position by means of a hoist mechanism operated by a ⅓ hp. motor. The pumping time to attain a vacuum of 0.5 micron or better in the 18″ bell jars is about eight minutes. A thermocouple gage is used for measuring fore pressure and a new metal ionization gage is used to read the pressure inside the vacuum chamber.

The operator is protected by a series of electrical interlocks on the cabinet which cut off the main power whenever a panel is removed which would expose danger points. These interlocks do not break the circuit supplying the vacuum pumps. Circuit breakers are used on all circuits instead of fuses.

Originally developed for the preparation of specimens for the electron microscope, as in the silica replica method, it is readily adaptable to other uses such as metal sputtering or freeze drying.

Extension Type Portable Pyrometer QC 913

The Wheelco Instruments Co. presents a new extension type portable pyrometer. This unit has been designed to permit a choice of plug-in angle extensions where a number of applications necessitate a universal instrument for measuring and checking temperatures requiring the use of different kinds of thermocouples. The new Wheelco instrument is recommended for use where a rugged, flexible light weight and accurate portable pyrometer is an essential requirement for quality control in plant and foundry.

A high resistance meter movement consists of coils, supported by two lapped pivots resting in two highly polished resilient sapphire jewels. Automatic compensation is a standard feature. A calibrated Briguet spiral automatically corrects every reading for variations in cold junction temperature. To protect the meter when instrument is not in use, a shunt lever is provided which can be snapped into position with the thumb.

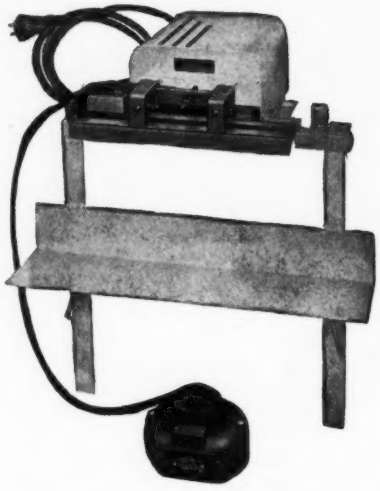
Plug-in extensions are available in either straight, 45 or 90° angle types. Adapters permit the choice of material and calibration of thermocouples. The pyrometer is contained in a sealed, dustproof, aluminum case having a "pistol grip" handle which may be locked in a horizontal or vertical position for ease of operation. A 3⅜″ reflector scale prevents parallax errors in reading.

Dual iron-constantan scales are calibrated from 0 to 600°F or 0 to 1000°F (with centigrade equivalents) and dual Chromel-Alumel scales are calibrated from 0 to 1600°F or 0 to 2500°F (with centigrade equivalents).

Heat Sealer QC 914

Pack-Rite Machines announce the development of their new solenoid operated Tech-Master heat sealer, 8-inch and 12-inch models.

With the magnetic solenoid operation, no foot pedal is required; thus, increasing production speed, and simplifying work of operator. Operator merely touches safety foot switch which actu-

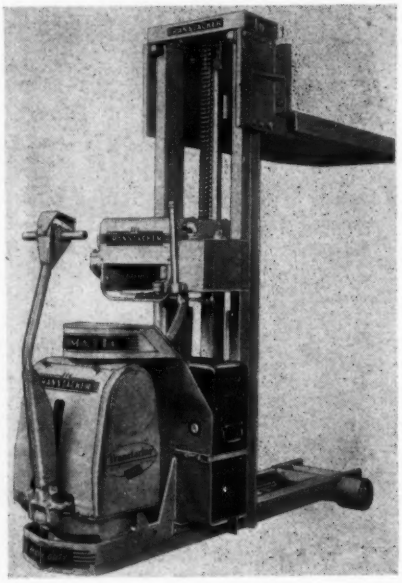


ates solenoid; length of dwell on material being sealed is controlled by length of dwell of operator's foot on foot switch. A long-life replaceable-ram type solenoid is used.

Installable on table or work bench at any angle, the Tech-Master has thermostat control; full length brass-sheathed expander cap heating elements; powerful leverage action; smooth-sliding pressure bars; white enamel adjustable feed tray; adjustment to regulate pressure on face of sealing bars; and choice of vertical or horizontal krimp impressions or flat-face sealing bars. A hole-punching device is obtainable, if desired.

High-Lift Hand Truck QC 915

Automatic Transportation has announced motorized hand truck counterpart of fork lift and high-lift platform trucks, the Transtacker. Weight and cost



are approximately half those of standard high-lift platform and fork lift trucks of similar load capacities.

Designed in four models for all types of pallets and skid platforms, the Transtacker handles vertical tiering of unit loads in production and storage facilities where floor or elevator capacities are limited, where extreme maneuverability is essential, and/or where volume of material or other conditions do not warrant investment required for standard platform or fork trucks. Load capacities range from 2,500 to 4,000 pounds and platform and forks raise to heights of 68 and 64 inches respectively.

The four Transtacker models are:

1. Platform model, for skid loads, capacity, 4,000 pounds.
2. Open-face pallet model, capacity 3,000 pounds.
3. Straddle type pallet model, for single- or double-face pallets, capacity 4,000 pounds. Load supporting front wheels, straddling the pallet, require only five inches between pallet stacks.
4. Extended load or "cantilever" pallet model, for double- or single-face pallets, capacity 2,500 pounds. As on standard fork lift trucks, counterweight instead of front wheels supports load, thus eliminating waste space between either double- or single-face pallet stacks.

The Transtacker's lift mechanism has all the advantages of regular fork lift trucks. It features a new hydraulic system and oversized pump and motor. Overall height is 83 inches, also the same as on fork trucks, made to clear standard seven-foot doors.

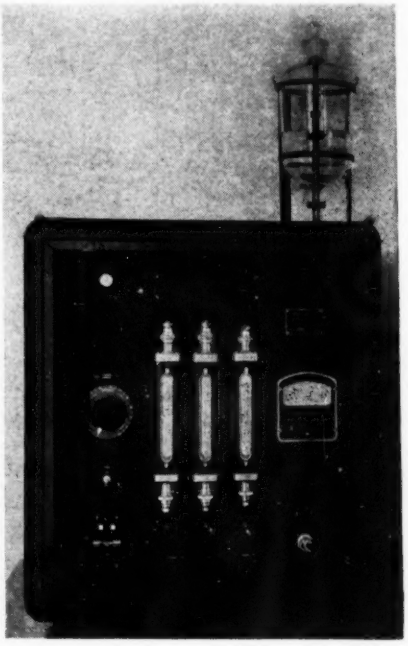
The Transtacker operates with Automatic's "finger-tip-control". Two buttons on the guide handle control forward and reverse power, while a third operates lift. Horizontal speed and the "dead man control" brake are controlled by vertical position of the brake handle.

Analyzer for Halogenated Hydrocarbons. QC 916

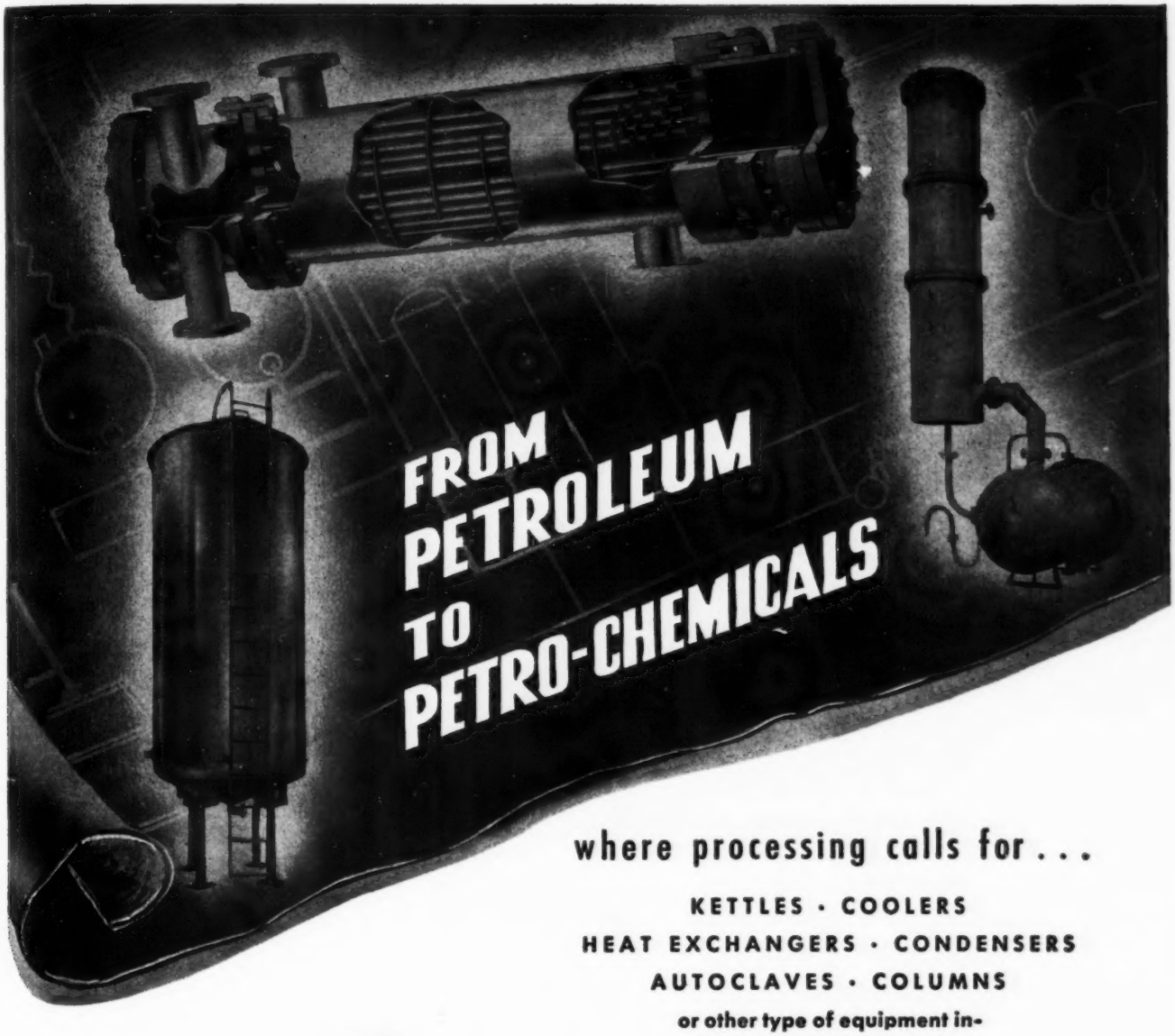
The health of workers exposed to trichlorethylene and other halogenated hydrocarbons can now be safeguarded by means of the Westvaco halogenated hydrocarbon analyzer, offered by Industrial Instruments, Inc. Available in both portable and permanent-installation forms, this equipment determines halogenated hydrogen concentrations and, when used in conjunction with the conductivity recorder, provides a continuous record of the magnitude of the contamination.

In operation, a constant stream of the sampled atmosphere is mixed with hydrogen in fixed proportion, and passed through a quartz combustion tube maintained at above 800°C. Under these conditions decomposition to the corresponding hydrogen halide, such as hydrogen bromide or hydrogen chloride, occurs. The hydrogen halide is continuously absorbed in a measured stream of distilled water, and the electrical conductivity of the water solution is measured and recorded.

One unit of semi-portable design, enclosed in an aluminum and magnesium cabinet approximately 2′ x 2′ x 2′, is available. The overall weight of this



semi-portable unit is approximately 125 lbs. exclusive of the recorder. 115 v. 60-cycle AC supply is required for its operation, with a current consumption under 10 amperes. In normal operation, distilled water is consumed at the rate of less than 1 liter per hour. The reservoir holds 4 liters. Tank hydrogen is consumed at the rate of approximately 1 cubic ft. at atmos-



where processing calls for . . .

KETTLES · COOLERS
HEAT EXCHANGERS · CONDENSERS
AUTOCLAVES · COLUMNS

or other type of equipment involving the transfer of heat.

Call on PATTERSON-KELLEY

PATTERSON-KELLEY
Heat Exchangers
AND
Process Equipment

Equipment of this kind is our specialty...has been, in fact, for many years. We are staffed with competent engineers to help design units to meet your requirements if our standard units do not fit the picture. Our engineers understand processing and the practical application of the principle of heat transfer.

And we have the manufacturing facilities and the skilled workmen to produce exceptionally well-made heat-transfer units such as listed above.

EST. 1880

THE PATTERSON-KELLEY *Company, Inc.*

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pheric pressure per hour of normal operation. No other utilities are required.

Permanent installations making provisions for tests of up to six separate sampling points, are also offered. A 4-point analyzer can be supplied mounted and completely enclosed in a steel cabinet measuring approximately 70" high x 18" deep x 22" wide, and provided with four ball-bearing rubber wheels. The weight of this unit is about 500 lbs.

Dewpoint Recorder QC 917

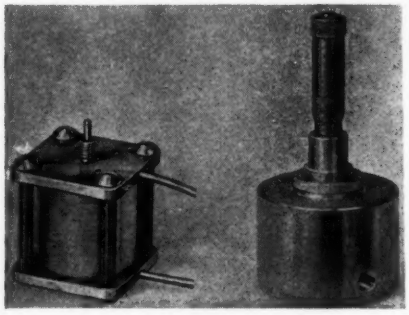
A new dewpoint recorder which can determine automatically and continuously the amount of moisture in a gas has been announced by the General Electric Co. The new instrument is a combination of heater, refrigerator, mirror and gas chamber. The test gas enters the gas chamber and comes in contact with a metal mirror. The refrigerator and heater cool or heat the mirror until a temperature is attained at which moisture in the gas forms dew on the mirror.

A photoelectric eye watches the mirror, and the mirror temperature is recorded on a graph or chart the moment dew forms. Working in co-ordination, the refrigerator and heater hold this dewpoint temperature within a tolerance of two degrees so that a continuous reading on the chart is achieved. The dewpoint temperature that is recorded can then be converted into the moisture content of the gas if desired. The recorder can be arranged so that it will flash or sound a warning when moisture in the gas reaches too high or too low a level, or control other equipment which will dehumidify or add moisture to the gas.

The new instrument is designed for operation at atmospheric pressure over a dewpoint range from ambient to —90 F. After initial installation, only minor adjustments are required for continuous operation.

Micrometer Valves QC 918

Standard Instruments Co.'s Microl Valves use 600 inches of capillary passage are enclosed in a metal container 1½ inches square to obtain precise and continuous flow control for liquids and gases. Flow control is obtained by moving the adjustable plunger thereby varying the



length of the capillary passage continuously from 4 inches to 600 inches. The valves will withstand vibration and mechanical abuse.

The flow of gas may be varied from 0.2 to 60 cubic inches per minute with a pressure drop across the valve of 15 pounds per square inch. Under the same conditions, the flow of water and other light liquids can be varied from 0.04 cc to 10 cc per minute. Special valves can be provided to meet these off-standard conditions.

Two valves are illustrated, the one on the right being a laboratory test model with micrometer adjustment to demonstrate the principle of operation. It is not for sale. The valve on the left is sold to equipment manufacturers to use as an integral part of their equipment. The left hand valve is 1½ inches square and 2 inches high.

Demineralizer QC 919

After five years of experimental engineering, The Barnstead Still & Sterilizer Co., Inc., announce a new double-action type water demineralizer for laboratories and industrial plants, requiring deionized water. This new 4-bed demineralizer is designed to give purer water at lower cost. It is called double-action because two cation resin beds and two anion resin beds are employed and the water passes through two complete ion-exchange cycles thus greatly increasing its purity.

The four resin beds also allow this new demineralizer to "stay-on-the-line" longer between regenerations. This means less work for the operator and lower cost per gallon.

The double-action 4-bed water demineralizer is manufactured in six models,

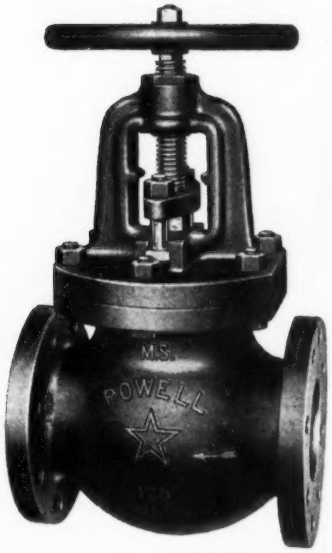
Let POWELL guide your way to assured, unfailing flow control

Through the ages, men on land and sea have been guided to their destination by the *North Star*. It is easy to find because it is almost in line with the two stars on the right end of the "Big Dipper."

Many years ago Powell patented the famous "Star" Regrinding Globe Valve. Today, the *Powell Star*, backed by 100 years of accumulated technical knowledge and manufacturing skills, is serving Industry as a guide to assured, unfailing flow control. The Complete Powell Line includes valves for every known industrial service and as new demands arise Powell Engineers will design valves to meet them.

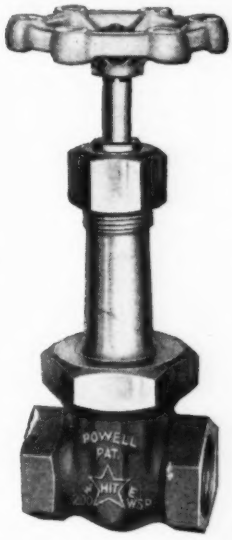
Catalogs gladly furnished on request. Kindly specify whether you are interested in Bronze, Iron, Cast Steel, or Corrosion Resistant Valves.

Large size 150-pound Stainless Steel "Y" Valve with flanged ends, bolted flanged yoke-bonnet and outside screw rising stem. Sizes 2½" to 12", inclusive.

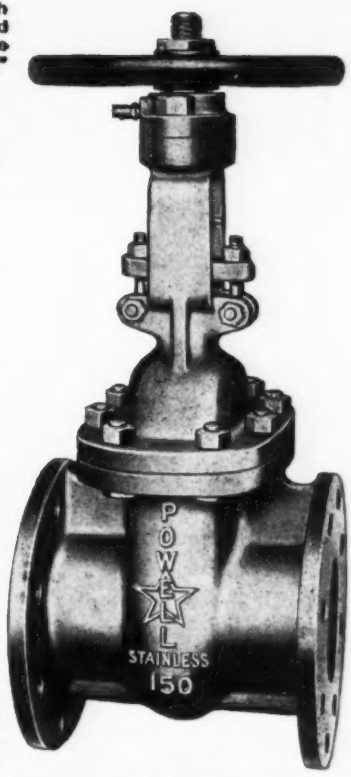


Large Iron Body Bronze Mounted Globe Valve for 125 pounds W. S. P. Has outside screw rising stem, bolted flanged yoke and regrindable, renewable bronze seat and disc. Also made in All Iron for process lines.

125-pound Iron Body Bronze Mounted Swing Check Valve with bolted flanged cap and regrindable, renewable bronze seat and disc. Also made in All Iron.



200-pound Bronze "White Star" Gate Valve with inside screw rising stem, union bonnet and renewable, wear-resisting "Powellium" nickel-bronze disc.



Standard 150-pound Stainless Steel Gate Valve with flanged ends, bolted flanged yoke-bonnet, outside screw rising stem and taper wedge solid disc. Sizes 2½" to 8", inclusive.

The Wm. Powell Co., Cincinnati 22, Ohio

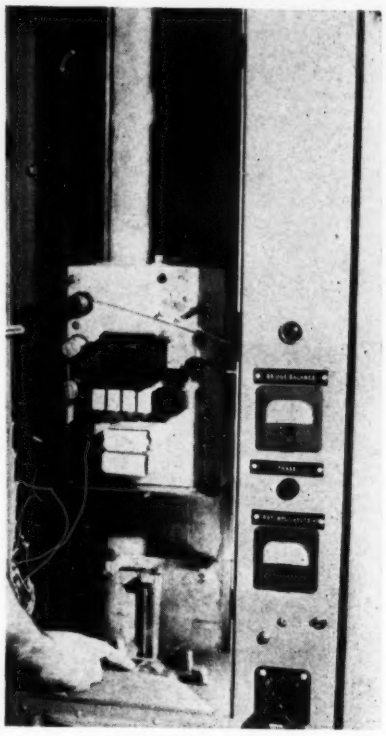
DISTRIBUTORS AND STOCKS IN ALL PRINCIPAL CITIES

POWELL VALVES

ranging from 3-1000 gals. capacity per hour.

X-Ray Photometer QC920

A new X-ray photometer which indicates and records the concentration of one chemical element in the presence of others in solids, liquids or gases has been announced by the General Electric Co. The new instrument, which is nondestructive to most materials, accomplishes this by measuring the change in absorption of X-rays between a sample and a standard. The sensitivity of this method of analysis varies from 0.01 per cent to 1.00 per cent, depending upon the difference in atomic numbers of the components making up the specimens.

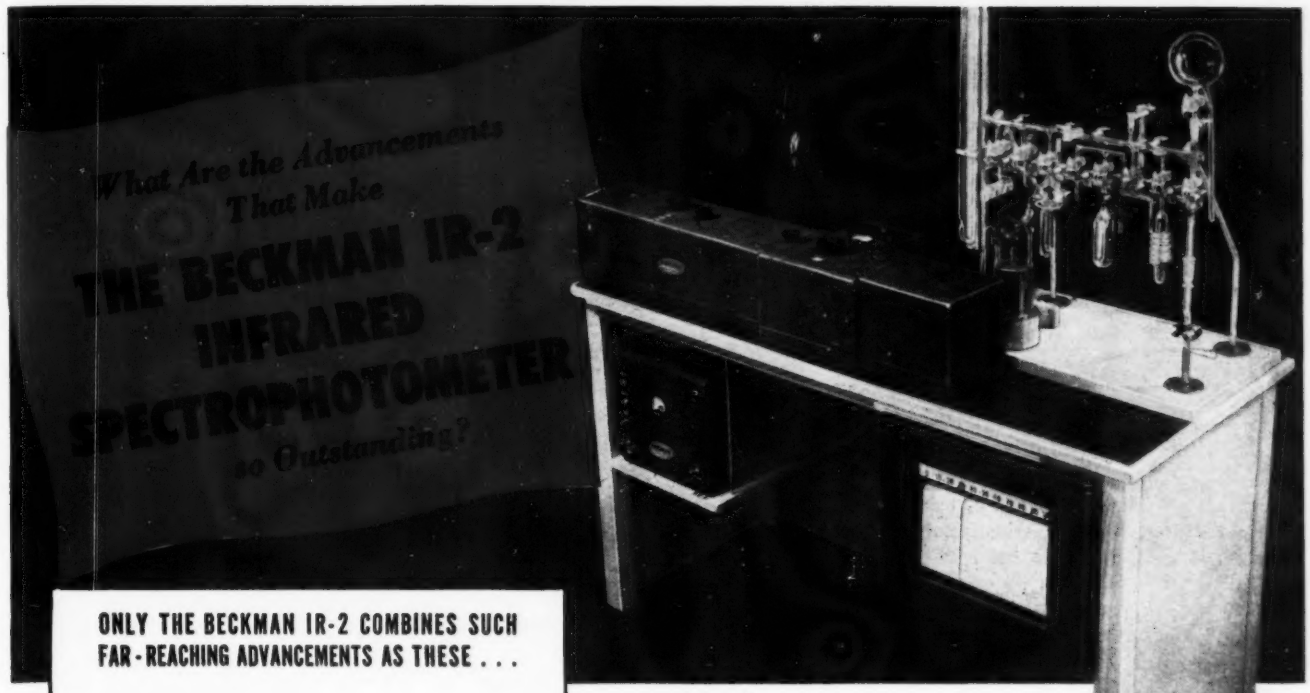


The X-ray photometer is housed in a standard control cabinet, 72" high, 28" wide, and 20" deep. The equipment incorporates a standard GE industrial generator. The X-ray transformer and tube are oil-immersed. The tube has a beryllium window and a tungsten target, and is water-cooled, requiring four pints of water per minute at 20 pounds per square inch for cooling. The equipment meets A. S. A. Class A standards Z54.1-1945, Safety Code for industrial use of X-rays.

All controls are available from the front of the cabinet. Provision is made for several types of test cells, in which the samples are contained, and the liquid and gas cells can be arranged for continuous flow of the materials being analyzed.

Recorder Controller QC921

A fully automatic recorder-controller for temperature and pressure has been announced by the C. J. Tagliabue Division of Portable Products Corp. By use of an



ONLY THE BECKMAN IR-2 COMBINES SUCH FAR-REACHING ADVANCEMENTS AS THESE . . .

HERMETICALLY SEALED
No costly air-conditioning required. Unaffected by humidity or atmospheric contamination.

INTEGRAL AMPLIFIER
No extra amplifier needed for recording. IR-2 can be direct-connected to standard recorder.

DIRECT-READING SCALES
Wavelength scale reads directly without curves, charts or computations. Percent Transmission scale reads directly.

CONSTANT RADIATION
Photoelectronic regulator maintains radiation constant within 0.1%.

ZERO DRIFT ELIMINATED
Greater accuracy; simpler, faster operation.

FALSE ENERGY ELIMINATED
Negligible stray light effects assure increased accuracy.

GALVANOMETERS ELIMINATED
Beam-modulation, bolometer and electronic amplifier eliminate vibration, temperature and non-linearity difficulties associated with galvanometers.

TEMPERATURE CORRECTIONS ELIMINATED
Entire instrument thermostated.

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Light sources, cell holders and other elements are interchangeable for a wide range of applications on gases, liquids and solids.

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THE BACKGROUND of experience behind this Beckman instrument is unmatched. From the first-hand experience, user suggestions and the practical knowledge gained in proving infrared equipment for industrial use, National Technical Laboratories has developed the new Model IR-2. It was Beckman infrared equipment, developed in close cooperation with leading petroleum scientists, that made possible the development of the first accurate, analytical methods for hydrocarbon analysis which contributed so much to the success of the butadiene and aviation gasoline industries. Today, in these and other industries throughout the world, there are large numbers of Beckman Infrared Spectrophotometers in use—a fact which has contributed immeasurably to the "know how" behind every Beckman instrument.

It is the continuing aim of National Technical Laboratories to produce instruments which combine the best previous achievement with unique developments which further extend the application of instruments in industry. The IR-2 Spectrophotometer again attains this goal. It integrates well-known basic principles of optics with new developments in electronic circuit design, many of which originated in our own laboratories in the production of thousands of scientific instruments. The result is an Infrared Spectrophotometer with increased convenience and versatility that greatly extend the usefulness of infrared methods.

There is no other instrument like the Beckman IR-2.
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adjustable cam, timing starts automatically when the temperature reaches the processing point and is terminated at precisely the desired moment. All valves, whether steam, air, water or overflow, are opened and closed as the process may require without manual attention of any kind.

A red light glows on the controller during the entire steam-heating phase of the process. When heating has been completed and steam has been shut off, the red light is extinguished and a white light appears. After sufficient time for cooling has elapsed, the white light goes out, indicating visibly to the operator that this cycle has been completed.

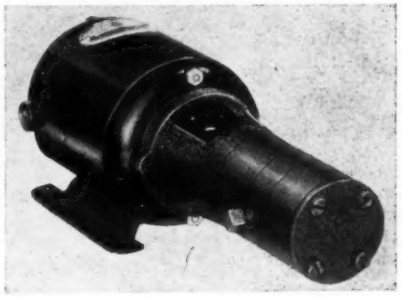
This unusually efficient instrument, its entire mechanism housed in a compact, relatively small case, is adaptable to many processes involving the control of temperature and pressure in the manufacture of rubber, plastics, chemicals and textiles.

Pump QC 922

A new positive pressure vane-type pump, VW-1, designed for handling non-lubricating liquids such as water has been announced by the Eastern Engineering Co.

Two composition bearings requiring no lubrication beyond that furnished by the liquid being pumped are incorporated in the pump. The vanes are made of the same material as the bearing. By means of a special design of the vanes and by applying the proper radii on the vane edges, the vanes are held in contact with the pump chamber. No centrifugal force, consequently, is required to maintain volumetric efficiency.

The pump is specifically designed for



use in systems having a relief valve and therefore has no bypass valve built into the pump design. Shaft sealing is accomplished by means of a mechanical rotary seal.

Delivery approximates one-half gallon per minute. The pump is suitable for operating pressure of from zero to 30 pounds per square inch and is self-priming. The Universal motor is 1/15 H. P. and is available in either 110 volts or 220 volts AC or DC.

Barrel Loader QC 923

A new combination elevating and unloading machine is now being manufactured by Revolvator Co. This loader is an adaptation of a short lift standard portable non-revolvable elevator, incorporating the well known Zee Bar and other features found in the standard Revolvator line. Included in the design are safetly features that make accidents almost impossible. A standard motor hoist unit is used, consisting of herringbone and worm gears, motor and magnetic brake in one sealed unit with all shafts running in oil on ball and tapered roller bearings. Outward end of shaft is carried on self-aligning precision ball bearings.

The machine is countersunk in position so that the top of the platform when lowered is flush with the floor. Barrels are rolled on to this platform by hand. Operator then throws the switch and the platform goes up. When the platform reaches the correct height for unloading it is tilted so that barrel automatically rolls off on to the upper level. Platform then (immediately and automatically) returns to the lowered position for another loading. Barrel cannot roll off of platform on the way up because a slight incline of platform keeps barrel against a raised stop which drops down at the proper height allowing barrel to roll off.

Condensers QC 924

The Niagara Blower Co. announces the introduction of the Niagara "Aero-Pass" condenser for the condensing of refriger-

ant gases with automatic year-around operation.

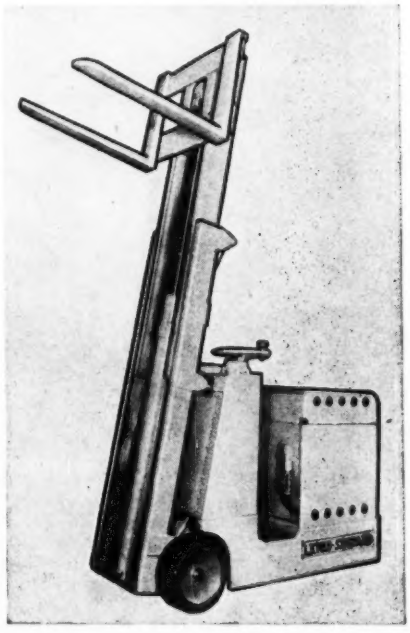
The apparatus consists of two condensing coils, the first of which is a dry coil (the Niagara Duo-Pass) in which the temperature of the gas is reduced close to the point of condensation. The second coil is sprayed with water, which, as it is evaporated in a fan-induced air stream, reduces the gas temperature causing condensation of the refrigerant. The water is recirculated and only the amount evaporated is consumed.

To this is added the Niagara "Balanced Wet Bulb Control". Through a recirculating duct a varying amount of the air stream is automatically diverted to hold the minimum head pressure required for the proper distribution of the refrigerant through its system.

An electric heater controlled by a thermostat to operate when the temperature approaches freezing in winter is also included in the water reservoir. If the temperature remains low, the sprays and fans are automatically shut-off and the water feed-line drained. A rise in the head pressure to a predetermined point automatically puts the condenser into operation. This equipment (which is patented) makes it possible for the condenser to operate with its evaporative cooling capacity effective throughout the year.

Fork Truck

Conservation of aisle width and increase of available storage space are claimed for the Lewis-Shepard 4000 lb. capacity electric power fork truck. Using a 48 inch



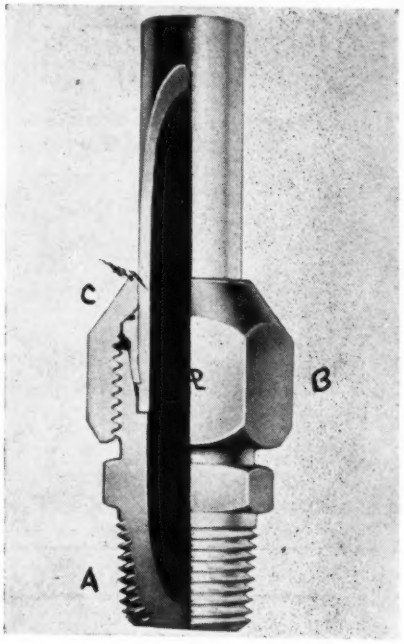
fork and carrying a 48 inch load, this truck will enter an aisle 12 ft. wide and, in one continuous forward travel of the truck, make a right angle turn and right angle stack, with no bucking or filling.

This operation is only possible with a

power fork truck which possesses the features of this Lewis-Shepard electric fork truck: (1) A short turning radius; (2) A low center of gravity; (3) An overall length no greater than 48 inches for fork and load.

Flareless Fitting QC 926

The Parker Appliance Co. announces the development of a new fitting for use in joining all types of metal tubing in hydraulic and fluid conveying systems. Eliminating the need for special flaring and assembly tools, brazing or soldering, the new fitting incorporates a steel ferrule



which, when body and enclosing nut are tightened up, acts to cut a shoulder in the tubing itself, thus providing a strong, tight sealing grasp for the assembly. The new fitting is expected to be particularly useful in high-pressure applications and in installations where thick wall tubing is used.

In the accompanying cross section, the arrangement which produces the cutting action can be seen. When the body "A" and the nut "B" are tightened, the confined ferrule "C" is forced forward. The cone angle of the body contacts the ferrule, and directs its sharp forward edge downward. The reduction of section in the leading edge of the ferrule permits deflection of the extermity so as to afford good camming contact for the bite into the tube. Further tightening at specified torques forces the ferrule into the tube, casting up a shoulder to resist pull-out when pressure is applied in the system. The actual fluid seal is also accomplished by the compression of the ferrule, which has a neglible effect on the internal diameter of the tubing being fitted.

Meanwhile, a second grip has been generated at the rear of the ferrule, for the dampening of possible vibration in the system, which would shorten the life of

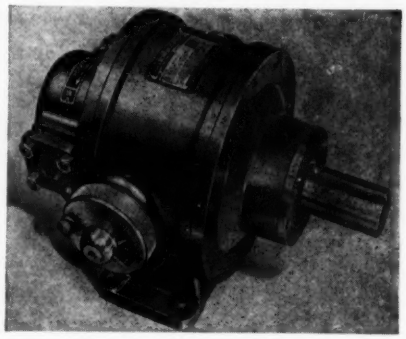
the front seal. The mismatch angles between the ferrule and body which produce this secondary backgrip have been carefully chosen for a positive, predetermined engagement, sufficient for dampening without kinking the tubing. The groove machined in the angular back surface permits this controlled action: the inner angle is first compressed and deflated inward to grasp the tubing, while the outer surface acts as a stop to limit this effect. The compression of the ferrule also provides a lock-nut action in the assembly, an additional factor contributing to long service life of connections.

The three fitting units have been provided with a loose fit with the tube size to be used, further promoting ease of assembly and permitting the tube to center itself during makeup to facilitate a uniform depth of cut. The only tube preparations necessary are square cut-off and removal of burrs. Joints may be broken at any time.

To be available initially in ¼"-1" o. d. tube sizes, in all conventional shapes and materials, the fittings will be threaded identically in size and pitch with the corresponding flared fitting.

Hydraulic Motor QC 927

Production of a new type of industrial hydraulic motor, combining high starting



torque with turbine-smooth power, has been announced by Superdraulic Corp. This development, known as the Superdraulic Triport Motor, parallels their line of high pressure hydraulic pumps.

The Superdraulic motor is useful for the application of power in plants where other types of power may represent a fire hazard.

The 47 hp motor is only 10½" in diameter and light enough to be easily handled by one man. Torque range is as high as 200 lbs. ft. The motor is available in two types, one rated at 26½ gpm with 3,500 psi, input at 1,200 rpm; the other at 19 gpm with 5,000 psi at 1,200 rpm.

Among the advantages claimed are infinitely variable speed control, forward and reverse, by means of convenient finger volume control valve; starting without clutches; and perfect control of acceleration and deceleration. Because of provision of 66 power strokes per revolution, the motor is claimed to have turbine smoothness.

PACKAGING & SHIPPING

by T. PAT CALLAHAN

Use of Alloy Drums Expected to Increase

The use of alloy drums for the shipment of chemicals has been progressing for a number of years, and many products have been satisfactorily shipped in them. During the war, when procurement of alloy containers was very difficult, further uses were discovered; but they had to be postponed until materials became more readily available. While at this writing alloys are not too plentiful there will be a large potential use for drums constructed from these materials.

T. Pat Callahan

At the present time, the alloys most commonly used in drums are stainless steel, nickel, and aluminum. The chief reason for their use is to eliminate corrosion and keep the product from contamination. Corrosion is the chief obstacle in the shipment of chemicals in metal containers. It not only weakens the container, but contaminates the product, and we feel that a discussion of corrosion as it affects various alloy drums will be helpful. The following article on corrosion as it affects alloy drums and barrels is taken from a catalog published by Stevens Metal Products Co., of Niles, Ohio.

"*Corrosion.*—Certain concepts of this subject that were formerly based on theory are now accepted as facts—at least sufficiently factual as to furnish the basis for the classification of corrosion. The conditions under which metals corrode are pretty well established, and the forms of corrosion can often be determined by visual inspection of the corroded material; but the cause is not so easily diagnosed. For example, pitting (probably the most prevalent cause for corrosion) may be due to only slight irregularities of the metal surface offering a pocket in which may lodge some floating particle in the solution differing in composition from the body of the solution; or it may be due to infiltration of a more easily corroded metal which may corrode galvanically or indirectly, forming a pit. Scale rolled into the sheet, blisters or laps, or iron pickup from the fabricating machinery may be the source of these pits. From minute inspection, however, an evaluation of the metal's resistance can be made and proper corrective steps taken to eradicate this or other potential causes for failure of the drum before the metal comes in contact with the corrodent.

"There is, however, one factor that is more or less a predominant cause for corrosion that cannot be easily discerned from visual inspection—that of grain boundary attack. This is especially characteristic of the stainless steels, although, when properly processed, they are not susceptible to inter-granular attack. The carbon content of the chromium-nickel alloys is the chief factor contributing to this type of corrosion when subjected to active corrosion media, and, while carbon cannot be entirely eliminated from these alloys, it can be held so low that with care in processing the metal remains passive. Carbon becomes damaging when present as a precipitated chromium carbide and is largely restricted to the grain boundaries, impoverishing the chromium content to the danger point.

"The change in the physical properties of the alloys takes place in the progress of welding. The temperature required to fuse the metal is around 2690°F. The body of the metal remains cold, although there is a region adjacent to the weld which will be heated to 950° to 1400°F, and if held at this temperature for any appreciable time, the alloy then becomes susceptible to inter-granular attack. If the welding is done rapidly, this region will be narrow; if done slowly, it will be wide and farther from the weld. This is the danger zone where the carbon is precipitated out of the solution and deposited on the grain boundaries leaving them vulnerable to attack.

"It follows, therefore, that the proper welding technique is essential to safeguard the resistance properties of the parent metal.

"However, each step in the fabrication of any of the corrosion-resistant alloys plays a most important part in a sucessful application.

"The nature of corrodents and their reaction under varying conditions are too complex to offer any cure-all recommendation. The reason for this is that most laboratory tests are made with insufficient control of conditions, It does not mean that the data is valueless, for laboratory tests, coupled with actual experience tests when available, furnish the basis for suggestion of what metal is best to use for the specific application but not the basis for guarantee. Obviously, the conditions, to which the alloy is subjected, such as concentration, temperature, agitation, impurities in the solution, time of contact, and degree of aeration have a vital bearing on the application. Consequently, any tabulation of suggested applications can only serve as a guide or indication in making a selection of the proper alloy for the specific application."

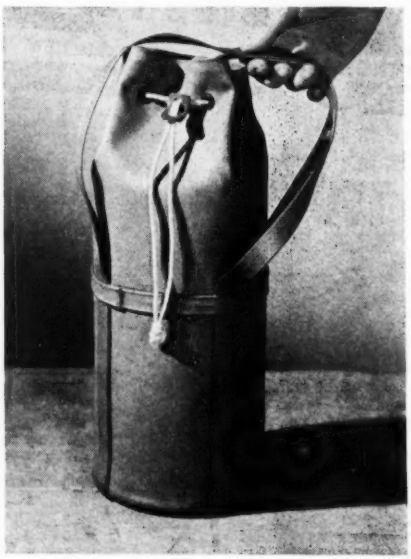
Under the Interstate Commerce Commission regulations there are specifications for various types of alloy drums, and we quote these as follows:

ICC 5C—Stainless Steel
ICC 5G—Stainless Steel
ICC 5K—Nickel
ICC 5X—Aluminum-Lined
ICC 42B—Aluminum
ICC 42C—Aluminum
ICC 42D—Aluminum

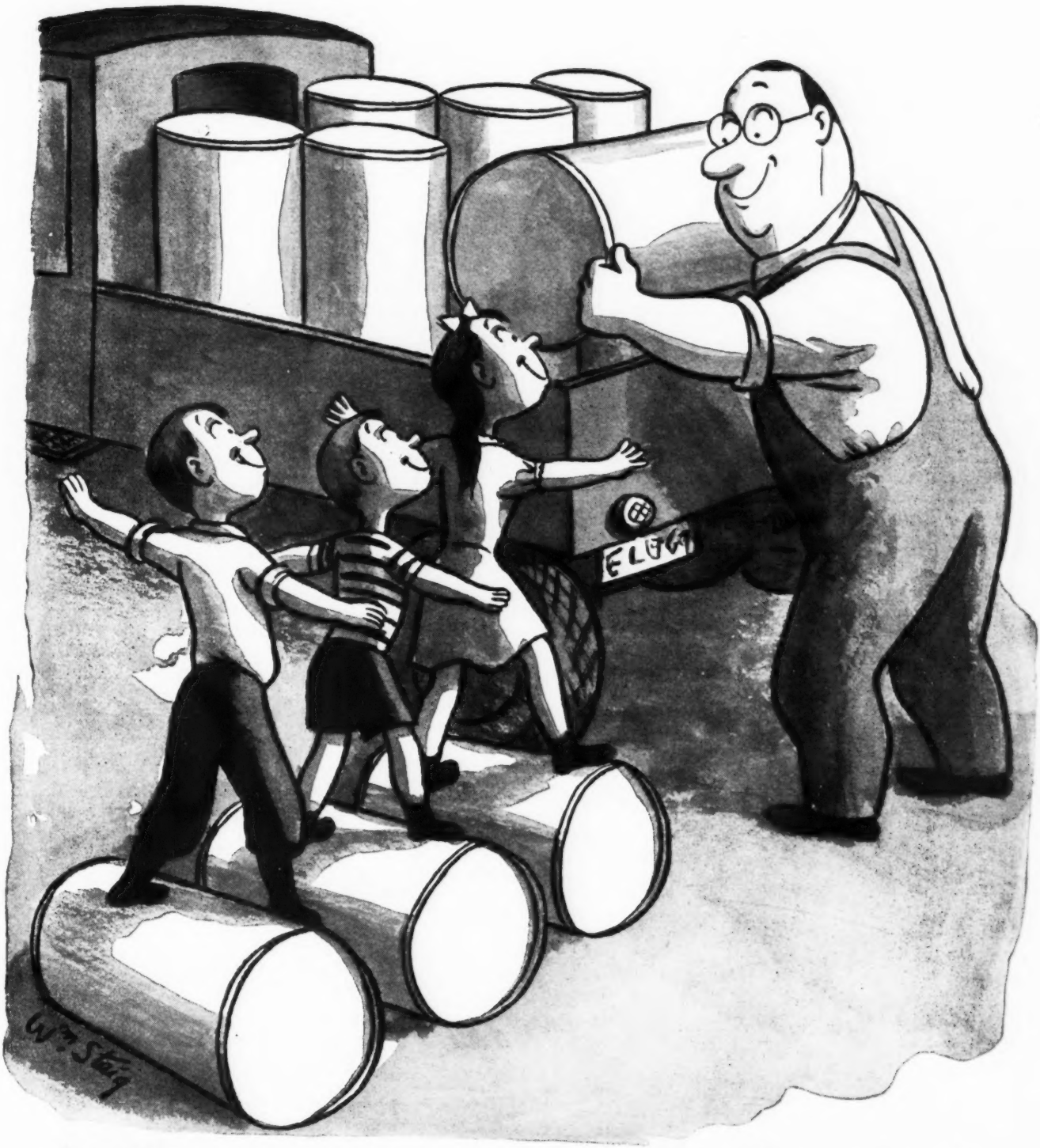
The above specification containers are prescribed for the shipment of various hazardous chemicals; for example, ICC 5C for certain concentrations of nitric acid, and ICC 5K for phosphorus oxychloride. There are, however, many other drums manufactured from various alloys which are not required to meet the ICC specifications, but are necessary to prevent contamination of liquids and powdered materials. These drums are of the full open-head type or tight-head type, and are overcoming many difficulties for shippers where steel or other metals are not satisfactory. It is felt that there will be a great amount of activity by the manufacturers of alloy drums when materials become available, and it goes without saying that there will be a large number of these types of containers used.

Bottle Carrier

A new cushioned, shock resisting bottle carrier, which is acid, caustic, and corrosion resistant, has been developed by



Benson & Associates, 332 S. Michigan Avenue, Chicago. It is specifically designed to minimize bottle breakage when handling and transporting bottled chemicals of a hazardous nature. It is impervious to broken glass and prevents leakage



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You'd think that Continental—one of the largest producers of fibre drums in the world—would be able to deliver enough on time. We would, too, if our plans for 100% plant and expansion had gone through on schedule. But, like everyone else, we've been held up by adverse conditions. When we get rolling at full speed again, you'll be able to depend on Continental for not only the best in quality, but the best in service, too.

of injurious chemicals, indelible inks, dyes, stains, etc., should a severe blow cause the bottle to break.

The bottle carrier is made of silver colored, impregnated light weight fabric, and contains a shock absorbing resilient inner padding. The entire bottle is enveloped. A draw string at the top insures complete coverage to prevent an upward splashing. Two corrosion-resisting fabric straps are vulcanized to and support the base, assuring a safe and comfortable means of carrying two or more bottles. The carrier is soft, pliable, and collapsible when empty. The removable padding and the carrier are easily cleaned.

Two sizes are now in production—for the one gallon glass jug and the 2 liter reagent bottle. This carrier can be designed for all size bottles.

The United States Rubber Company manufactures this item exclusively for Benson & Associates.

Fiber Drum Manual

Fiber Drums, Directions for Handling and Storing, has just been issued by the Manufacturing Chemists' Association of the United States, 608 Woodward Building, Washington 5, D. C.

This manual was prepared by the Miscellaneous Packages Committee of the Manufacturing Chemists' Association, and is of particular interest to the manufacturer and user of many chemicals shipped in fiber drums.

This new manual covers fiber drum packing, shipping and storing, car loading and unloading, bracing, filling and sealing, and recommended handling equipment. It has twenty-five illustrations.

Strapping Machine

Signode Steel Strapping Company, Chicago, announces a new A-2 seal feed strapping machine for production strapping on

conveyor or centralized shipping systems. This semi-automatic one-piece strapping tool tensions, cuts and seals in three continuous operations. The A-2 will strap boxes, cartons, crates, packages or bundles in a wide range of sizes and weights. A-2 is available for use with 3/8" x .015, 3/8" x .020, 1/2" x .015, 1/2" x .020 strap. It is light in weight—aluminum castings house the hardened steel moving parts.

Bag Sealer

To answer the demand for a double-drive, low-priced rotary heat sealer for bags, pouches, etc., Pack-Rite Machines, 714 West Wisconsin Avenue, Milwaukee, Wis., announces the development of its new "Fast-Tite" model.

Thermostatically controlled to seal a wide range of heat sealing materials, the "Fast-Tite" can be operated horizontally, vertically or at an angle and can seal any length bag, pouch, barrier, etc.

"Double-Drive"—the driving of both sealing roller shafts, thus eliminating pulling or distortion of the bags as they travel through the sealing rollers—is one of the principal features.

Powerfully constructed for long life, the "Fast-Tite" is light weight and compact—approximately 19 inches from front to back; 9 inches from left to right and 9 inches from mounting base to top. A lifting-lowering stand is obtainable.

A preheater attachment is available for materials which require preheating before entering sealing rollers.

PALMALENE

A NEW PALM FATTY ACID OF MEDIUM TITRE, SYNTHETICALLY MADE

Palmalene's specifications (see below) make it suitable for many uses. It is excellent as a replacement for Stearic Acid in rubber compounding; and is especially suitable for textile specialties, soap making, alkyl resins, wetting agents, cosmetics, kier assistants, driers, pulp manufacture and paper manufacture.

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Iodine Value	55-60
Titre	35

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INDUSTRY'S BOOKSHELF

Vapor Adsorption

VAPOR ADSORPTION—INDUSTRIAL APPLICATIONS AND COMPETING PROCESSES, *by Edward Ledoux.* Chemical Publishing Co., Inc., Brooklyn, N. Y., 1945; 338 pp., $8.50. Reviewed by J. William Zabor, Pittsburgh Coke and Chemical Co.

THE TITLE of this volume is misleading; qualifications embodied in the subtitle clarify somewhat the limited scope of the text. The author concerns himself mainly with the evaporation, condensation, adsorption, and desorption of water, though other vapors and gases are briefly considered. No attempt is made to examine critically the several theories of adsorption which have been developed during recent years. Occasionally the author proffers explanations for observed phenomena which are frequently the subject of controversy, without the suggestion of alternate hypotheses which may be equally probable.

The author's approach to the subject is rather unique and interesting. Frequently, however, the reader is apt to be confused by the unorthodox use of some of the symbols and definitions and by the unconventional use of x/m as the abscissa and p/po as the ordinate in plots of isotherms which play an important role in a book of this kind.

The subject matter is divided into four parts: I—Static Adsorption; II—Saturation of Air; III—Dynamic Adsorption, and IV—Industrial Applications. The method of treatment is apparently designed to give preliminary information to engineers concerned with the application of adsorption or competing processes to industrial problems. This function is adequately performed. The discussions of some of the various applications stress many of the precautions or general considerations which may be important to the engineer and which deserve further investigation for the particular situation with which the reader is faced. It is unfortunate that the author did not include a comprehensive bibliography.

Nitrogen Compounds

AN OUTLINE OF ORGANIC NITROGEN COMPOUNDS, *by Ed. F. Degering and collaborators.* University Lithoprinters, Ypsilanti, Mich., 1945; 752 pp., $7.50. Reviewed by E. Augustus Swart. Squibb Institute for Medical Research.

THE AUTHORS have completely revised the previous editions of the "Outline," and have added several new chapters. They have presented in forty-five chapters the chemistry of the more important nitrogen compounds, using primary sources for the data that have appeared since 1926 and secondary sources for those appearing prior to that time. The history, occurrence, structure, uses, nomenclature, methods of preparation, chemical and physical properties of the following organic nitrogen compounds are outlined: nitroalkanes, polynitroalkanes, nitroalkenes, halonitroalkanes, nitrohydroxyalkanes, nitrosoalkanes, aromatic nitro compounds, nitroso compounds, oximes, aliphatic amines, amino acids, polypeptides, proteins, diazenes, hydrazoic acid and triazenes, aromatic amines, alkanolamines, aromatic diazo and diazonium compounds, azoxy compounds, hydrazines and some derivatives, urea, some derivatives of urea, thiourea, guanidine, guanidine derivatives, derivatives of sufamic acid and sulfamide, aryl amides and imides, aliphatic nitriles, carbylamines, cyanogen and related compounds, aromatic nitriles, carbylamines, cyanogen and related compounds, aromatic nitriles, isocyanates, thiocyanates, isiothiocyanates, organic nitrogen dyes, alkaloids, other medicinals containing nitrogen, vitamins containing nitrogen, high polymers of nitrogen content, pyridine, quinoline, some miscellaneous nitrogen compounds, and explosives. In addition, isomerism of organic nitrogen compounds, fixation of nitrogen, and the ammonia system of compounds are discussed. An extensive index, with references to paragraphs that have been numbered in the margin, is a valuable asset.

Though the authors have expressly written this outline for use as a textbook, it is this reviewer's conviction that it will serve better as a reference book for research workers in the field of nitrogen chemistry; the mass of factual data presented without critical analysis could easily confuse the initiate to the field.

Reaction Guide

ENCYCLOPEDIA OF CHEMICAL REACTIONS—VOL. I, Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron and Bromine; *compiled and edited by C. A. Jacobson.* Reinhold Publishing Corp., New York, 1946; 804 pp., $10.00. Reviewed by John C. Bailar, Jr., University of Illinois.

THE PRESENT volume should be looked upon as a beginning, not only in the sense that it covers the reactions of only eight elements, but also in the sense that the coverage of these eight is incomplete. Subsequent volumes are to describe the reactions of the other elements and their compounds, and supplementary volumes are to complete the coverage and keep the work up to date.

Each entry consists of the formula of the reactant, the formula of the reagent, a brief description of the conditions under which they react, a balanced equation for the reaction, the reference to the journal from which the report was taken, and the assigned number of the abstractor. In all, 3073 reactions are listed. Some of these are obvious (such as that between arsenic acid and calcium hydroxide), but many are unusual and little known.

The references given are those which the abstractor encoutered in his assigned volume or journal, and do not necessarily represent the earliest or most important references to the reaction in question. The full value of the encyclopedia will be realized only when all of the important references to each reaction are listed.

The usefulness of the book is greatly enhanced by the inclusion of indexes of reagents and of substances formed.

For the most part, the nomenclature recommended by the Committee of the International Union of Chemistry has been used, exceptions being made in the cases of certain well known names. It would have been wiser to employ the I.U.C. system throughout, for only in this way will its use become general. Formulas of ammonates are unfortunately written with the NH_3 at the end, rather than adjacent to the metal ion to which it is coordinated.

On the whole, however, the work is well organized, and the volume will be of great value to research workers in inorganic chemistry. As the numbers of volumes and their coverage increase, the usefulness of the book will rise rapidly. It is hoped, therefore, that Prof Jacobson and his collaborators will continue the compilation as expeditiously as possible.

Poisons

POISONS, *by Vincent J. Brookes and Hubert N. Alyea.* D. Van Nostrand Co., New York, 1946. 176 pp., price $3.00. Reviewed by Wm. D. McNally, M.D., consulting chemist and toxicologist.

THE FIRST CHAPTER covers the general features of poisonings. The second chapter is devoted to the basic information for the investigator. In order to carry out the many tests described, a fairly well equipped chemical laboratory would be required. This book is well written, and gives the necessary information for those interested in first aid. The material under investigation in a suspected case of poisoning should be sent to a toxicologist for confirmation.

BOOKLETS & CATALOGS

Chemicals

A974. ALDEHYDES, their properties, specifications and characteristics are the subject of a booklet (Form 5278) of the Carbide and Carbon Chemicals Corp.

A975. ANHYDRIDES. The properties and uses of acetic anhydride, propionic anhydride, butyric anhydride, and maleic anyhydride are discussed in detail in a recent booklet (Form 5280) of the Carbide and Carbon Chemicals Corp.

A976. BENZOATES. A new edition of the booklet titled, "A Treatise on Benzoates", is available from Seydel Chemical Co.

A977. CHEMICALS. The various chemicals and industrial explosives manufactured by the Hercules Powder Co. are discussed in a recent 40-page booklet.

A978. FINE CHEMICALS. Price List. Chemo Puro Mfg. Corp.

A979. FLAVORS AND DRUG SPECIALTIES. Price List. Northville Laboratories, Inc.

A980. GASES. "Great Grow the Gases" titles a brochure which is available from the Department of Information of the American Petroleum Institute.

A981. KETONES. The physical and chemical properties of ten commercially important ketones produced by Carbide and Carbon Chemicals Corp. are the subjects of a recent booklet (Form 4767).

A982. PLASTICS. E. I. du Pont de Nemours & Co. has issued a 12-page booklet describing and picturing uses of Du Pont plastics.

A983. METHYL ISOBUTYL CARBINOL is discussed in detail in a recent technical booklet (SC : 46-1) of the Shell Chemical Corp.

A984. SILICONE VARNISH. Dow Corning Corp. has issued a 4-page booklet describing and illustrating the use of DC 996 silicone insulating varnish.

A985*. STAINS. "Insure Your Stain Profits with Chadeloid Stains" titles the first issue of a new bi-monthly publication of the Chadeloid Corp. Inquiries must be on business letterhead.

A986. STEEL CLEANERS are the subjects of a 4-page color leaflet available from the Pennsylvania Salt Manufacturing Co.

Equipment

F790. ACID ELEVATORS. The stoneware acid elevators of the General Ceramics and Steatite Corp. are the subject of a 4-page bulletin (No. 201).

F791. AIR EJECTORS. The Condenser Service & Engineering Co., Inc. has issued a new catalog illustrating and describing their line of Conseco steam jet air ejectors.

F792. ALLOY STEELS. Price list of warehouse stocks. Michigan Steel Casting Co.

F793. ATOMIZING NOZZLE. The new humidifying atomizing nozzle of Spraying Systems Co. is the subject of a recent data sheet (No. 2830).

F794. BOILER WATER CONDITIONING. "The Six Fundamentals of Betz Water Conditioning Service" titles a recent booklet available from W. H. and L. D. Betz.

F795. CONVEYOR IDLERS. The Chain Belt Co. has issued a new 26-page booklet (No. 463) on their complete line of Rex belt conveyor idlers.

F796. DIELECTRIC HEATER. The new dielectric heater for plastics preforming, of the Industrial Heating Division of General Electric Co., is the subject of a recent bulletin (GEA-4623).

F797. DIESEL ENGINE PYROMETER. The Bristol Company has just announced a new bulletin (P1233) describing their new diesel engine pyrometer.

F798. DEMINERALIZERS are the subjects of a new bulletin (No. 112) of the Barnstead Still & Sterilizer Co., Inc.

F799. ELECTRONIC POTENTIOMETER PYROMETER. The Bailey Meter Co. has issued a 16-page bulletin (No. 232) describing the Pyrotron electronic potentiometer pyrometer.

F800. FILTER MEDIA. Micro-porous porcelain filter media is the subject of a new 32-page catalog of the Scientific Equipment Division of Selas Corp. of America.

F801. HEAT EXCHANGER TUBING. "The G-R Twin G-Fin Section" titles a recent 16-page bulletin (No. 1614) of The Griscom-Russell Co.

F802. HEAT TRANSFER EQUIPMENT. "Heat Transfer Apparatus for Power Plants" titles a recent 12-page bulletin (No. 1250) of The Griscom-Russell Co.

F803. HOT WATER STORAGE HEATERS are the subjects of a 20-page bulletin (No. 17) issued by the Patterson-Kelley Co.

F804. HYDRAULIC PRESS. The Watson-Stillman Co. has announced the availability of a new illustrated bulletin describing their 40-ton capacity general purpose hydraulic press.

F805. INDUSTRIAL RUBBER PRODUCTS. B. F. Goodrich Co. has just issued a 28-page pocket-size booklet on their complete line of industrial rubber products.

F806. INTERVAL TIMER. The new electronic interval timer model 1029 is the subject of a recent leaflet of Electronic Controls, Inc.

CHEMICAL INDUSTRIES TECHNICAL DATA SERVICE

Chemical Industries, 522 Fifth Ave., New York 18, N. Y. (8-6)

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A975	A982	F792	F799	F806	F814
A976	A983	F793	F800	F807	F815
A977	A984	F794	F801	F808	F816
A978	A985*	F795	F802	F809	F817
A979	A986	F796	F803	F810	F818
A980	F790	F797	F804	F811	F819
				F812	F820

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F807. LABORATORY EQUIPMENT is the subject of a 6-page folder of The Electric Hotpack Co., Inc.

F808. LIQUID METERS are the subjects of a recent 12-page bulletin (Form 566-3) of the Neptune Meter Company.

F809. LUSTER DETERMINATION. "Luster Determination with a Photoelectric Photometer" titles a recent 8-page bulletin available from Dexter Chemical Corp.

F810. OXYGEN BREATHING APPARATUS. A one-page folder is available from Mine Safety Appliances Company describing and picturing their Chemox oxygen breathing apparatus which generates its own oxygen.

F811. PLUG VALVES. ACF full pipe-area lubricated plug valves are the subjects of an 8-page booklet of the American Car and Foundry Co. Catalog CCS-10M-46.

F812. PUMPS. "Process Pumps" titles a 12-page bulletin (Form 7094) of the Ingersoll-Rand Co.

F813. ROTAMETERS. The "Rota-Tronic" instruments to indicate, record, totalize and control miniature flow rates is the subject of a recent catalog section (No. 52-A) of Fischer & Porter Co.

F814. RUBBERIZED INDUSTRIAL CLOTHING is the subject of an 8-page bulletin of the Archer Rubber Co.

F815. RUBBER-LINED TANKS. The B. F. Goodrich Co. has issued a 12-page catalog section (No. 9020) describing their line of Vulcalock rubber-lined tanks and tank cars.

F816. SOLDERING UNIT. The Marion Electrical Instrument Co. has issued a 4-page folder describing and picturing their portable bench-type induction soldering unit.

F817. STRAINERS AND SEPARATORS. A new 16-page bulletin (No. 4650) describing the complete line of Adsco strainers and separators, is available from the American District Steam Co.

F818. TACHOMETERS are the subject of a 2-page leaflet of O. Zernickow Co.

F819. TEMPERATURE CONTROL. Wheelco Instruments Company has issued a 4-page folder (No. D4-2) describing their latest electronic temperature control, the Multronic Capacitrol.

F820. V-BELT DRIVE. The Multiple V-Belt Drive Association has just issued a 16-page booklet, illustrating the operation advantages of V-Belt drive.

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Here is a new process by Cochrane that is of vital importance to the manufacturer of pharmaceuticals, chemicals, beverages, food and other process-manufactured products. When the cost of pure water, commercially equivalent to distilled water, can be reduced to as low as one-twentieth of its present cost, the result is bound to show up favorably in terms of profits—and it is high time something should be done along these lines.

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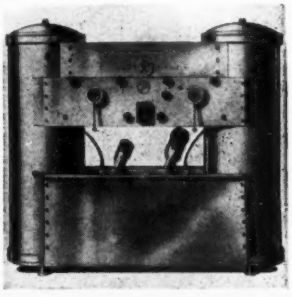

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NEWS OF THE MONTH

Wyandotte to Begin Manufacture of Organic Chemicals

As an outgrowth of plans formulated during the past few years, Wyandotte Chemicals Corporation, Detroit, has appropriated $25 million to be expended within the next eighteen months on additions to its plant at neighboring Wyandotte, Mich. According to E. M. Ford, president, the new facilities will increase the company's chemical production by 100,000,000 pounds per annum and raise sales volume by a full 30 per cent. Of major significance is the fact that Wyandotte, which for 54 years has confined its activities to the manufacture of inorganic chemicals, is entering the organic chemicals field on a large scale.

The decision to begin commercial manufacture of organic chemicals was considered as early as 1940, officials state. At that time an organic chemical research program was initiated, and later expanded. Too, a market research division was organized as a separate function of the sales department. Studies of both groups led to the conclusion that expansion of soda ash, chlorine, etc., output was warranted in view of increasing consumer demand; manufacture of organic chemicals was decided upon as a means of diversification—important to provide insurance against future economic upheavals.

One of the largest units planned is the glycol project. Construction is already under way and it is anticipated that capacity operations will be realized by next spring. The principal product will be a substantially pure grade mixture of ethylene and propylene glycols—suitable for many of the uses to which ethylene glycol has been put—(i. e., antifreeze, resins, cellophane, dynamite)—and in addition for some other novel industrial applications.

Other products of the glycol division will include chloro-ethers, polyglycols, ethylene and propylene dichlorides, and solvent naphthas. The process to be em-oped and patented by Wyandotte, utilizi-g petroleum, chlorine, and lime as raw materials.

Another organic chemicals plant included in the program is a commercial unit to be completed in the fall of 1947 for the manufacture of an alkyl aryl sulfonate type synthetic detergent. As a supplier of alkalies to the soap industry, Wyandotte will market the synthetic detergent as a companion product to soap producers. Too, part of the production will be channeled to the company's cleaning compounds division, for formula incorporation.

Larger facilities for the manufacture of fine chemicals, at present in the pilot plant stage, are also on the drafting board. Among these newer chemicals are sodium xylene sulfonate and a variety of benzene sulfon derivatives, such as benzene sulfonamide and alkyl benzene sulfonates.

The expansion phase of the construction program entails increased capacity for almost all the company's alkali products. Soda ash output will be upped 15 per cent, by the use of a modified ammonia soda process. Chlorine and sodium bicarbonate facilities will also be extended, together with a 250 per cent increase in precipitated calcium carbonate units.

Altogether, the additional capacity for these inorganic products will approximate 600 tons per day. The calcium carbonate project will be in operation by next January, with the other inorganic chemicals plants scheduled to come in a year later.

Twelve Nations Agree On Patent Pool

The twelve-nation conference on the disposition of more than 100,000 formerly German-owned patents registered in various United Nations has agreed on a plan to make such patents freely available to nationals of all countries signatory to the agreement.

This agreement is a shattering blow to Germany's known plans to recover its former influence in key industries throughout the world. The agreement is also a major step toward the United States Government's objectives in the field of world trade policy.

If the various countries that confiscated German patents during the war—most of which had already agreed at the Paris reparations conference last year not to return them to the Germans—had decided to hold the patents exclusively for their own nationals, almost insuperable barriers to trade would have resulted.

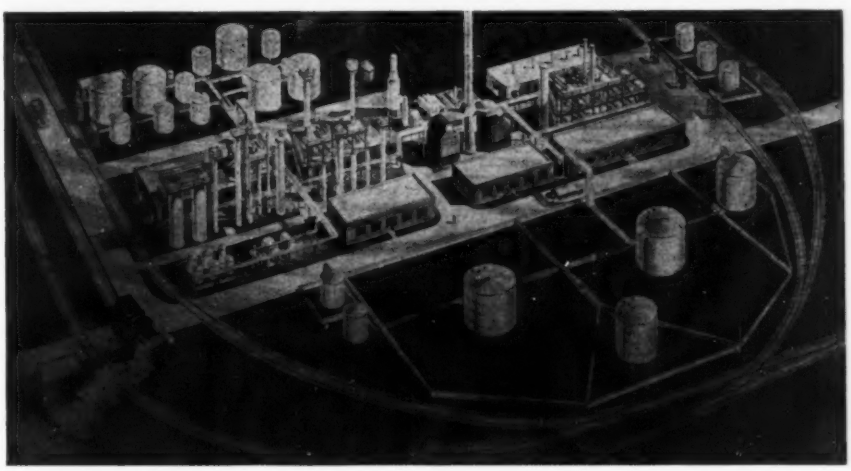
With such a policy no country could have permitted imports of any products likely to infringe German patents. Since the United States has some 30,000 such patents, France has 50,000 and Belgium, the Netherlands and other countries have several thousand each, the number of products virtually barred from trade would have been very large.

Standard Oil Regains I. G. Patent Rights

A final decree has been entered in the Federal court regarding the action of Standard Oil Co. of New Jersey to recover 798 patents seized by the Alien Property Custodian in 1942 and 1944 because of alleged German interests.

Under the order signed by Federal Judge Charles E. Wyzanski of Boston, the oil company attorneys estimated that the firm retained "title or at least exclusive licensing rights" to 70 per cent of the patents, which were part of a $35,000,000 purchase from I. G. Farbenindustrie in 1929 and 1939.

While rights to the principal buna rubber patents, which were involved in the litigation, were retained by the Alien Property Custodian, company attorneys



Architect's sketch of the ethylene-propylene glycol plant under construction by Wyandotte Chemicals Corporation, Wyandotte, Michigan.

declared that they had been granted, royalty free, to all manufacturers by Standard Oil "to expedite the synthetic rubber program."

Chemical Issues Lead On Big Board

The largest single aggregation of stocks by industrial grouping now listed on the New York Stock Exchange is the chemical company classification with a market value approximating 9.9 billion dollars in July. In total 1,298 stock issues were listed during the month.

Among the other major categories of stock, by market value, were: petroleum, $9.0 billion; railroad, $6.0 billion; retail merchandising, $5.4 and the utility group, which is divided into four sub-classes, slightly in excess of $10 billion.

Fernelius Advanced to Harshaw Managerial Post

Grant R. Fernelius, appointed plant manager of the Elyria, Ohio, plant of Harshaw Chemical Co. Paul Hines, formerly manager of the Elyria unit, has assumed a similar post at Harshaw's El Segundo, Cal., plant.

Expect British Creosote Shipments

Present indications are that Great Britain will resume export shipments of coal tar creosote to the U. S. during the latter half of this year, which will assist in easing somewhat the tight market situation which has obtained in this commodity for some months past. U. S. production has been at low ebb, ever since the end of the war, when steel and and coal strikes curtailed output. Demand in excess of visible supplies, amounts to some 20 million gallons in the wood preservative field alone.

Prior to the war creosote imports averaged 40 million gallons annually, to represent about 28 per cent of total consumption. However, shipments from Great Britain are not expected to exceed six million gallons this year

Permit Penicillin Exports

Export of bulk penicillin in limited quantities is now possible under licensing control of the Office of International Trade, Department of Commerce, the Civilian Production Administration has announced.

Production of bulk penicillin for processing into the non-injectable dosage forms now exceeds domestic requirements, CPA said, and permission has been granted to export the excess.

The production increase resulted from the development of more productive mold strains, and this increased output has exceeded the capacity of the industry to process the product into the injectable form.

Rosin Restrictions Removed

Civilian Production Administration has removed the reporting requirements covering consumption and stocks of rosin by revoking its rosin directive.

This order (M-387) was instituted during the war in order to conserve rosin. It was amended in January 1946, at which time quota restrictions were removed. The reporting provisions were retained to determine the increased demand.

Current Chemical Statistics Index Planned

A new periodical service which will index current government statistics on chemicals is in the course of preparation by the Chemicals and Drugs Section of the Bureau of Foreign and Domestic Commerce. This will be the first time that such information has been made available on a government-wide and current basis.

The project has the endorsement of the Chemical Market Research Association and the Interdepartmental Chemical Statistics Committee, the latter being the government's advisory body on chemical statistics.

It is planned that the index will be issued either once or twice a year, with the first issue scheduled to appear this fall. Details of publication and release have not been determined. Further announcement is expected in advance of release.

Argentine Plans Major Insecticide Purchase

An appropriation of $9,000,000 for the purchase of insecticides and equipment for exterminating locusts has been authorized by the Argentine Government, according to the Department of Commerce.

The locusts are endangering agricultural crops, particularly fruit, and the cattle industry which together represent an income of $1,000,000,000.

Most of the insecticides and equipment purchased will be used directly by agriculturists and cattle growers; the remainder will be used by the government.

Purchases will include 2,200,000 pounds of powdered locust insecticides and 3,300,000 pounds of poisoned bait.

Argentina also plans to buy 50,000 flame blowers, 10,000 hand powder blowers, 500 motorized mechanical powder blowers, poison bait mixing machines and other equipment.

Cabot Transfers Duffy

George J. Duffy, technical manager of special blacks in the research department of Godfrey L. Cabot Inc., has been transferred to Pampa, Texas, to direct research at the company's new Texas laboratory.

Japanese Allowed to Exploit Phosphate Deposits

Allied Headquarters has authorized the return of the Japanese to Angaur Island in the Palau archipelago from which they were expelled in September, 1944, to mine phosphate rock.

Formerly about one-quarter of Japan's 1,500,000 tons of phosphates originated at Angaur. Production this year is expected to be comparable to pre-war output.

Louisiana Makes Bid For New Industries

To further encourage industrialization of Louisiana, Governor Jas. H. Davis of that state, recently signed a bill to reduce the corporation franchise tax to $1.50 per thousand.

The recent bill is one of several which will be submitted to the electorate providing ten year tax exemption for new manufacturing plants, and additions to existing ones, and empowering municipalities and parishes to construct buildings for sale or rent to manufacturers in their respective communities.

Extend Babassu Contract For Year

The Department of Agriculture has announced that the United States-Brazilian babassu agreement has been extended for the period of one year through July 24,

1946. It would have expired July 25 this year.

Under the terms of the extension the Commodity Credit Corp. or its designees will purchase the entire exportable surplus, which shall not be less than 50 per cent of the total production, either in the form of babassu kernels or oil, at prices averaging $16.50 per metric ton higher than prevailed for the last four years.

Commodity Credit Corp. will arrange for the importation of the babassu kernels into the United States by contracting with crushers and importers as it has in the past. Import permits will be granted only to firms holding such contracts.

Schenley Establishes Fellowships

Schenley Distillers Corporation, and Schenley Laboratories, Inc., through their affiliate, The Schenley Research Institute, announce the establishment at the University of Wisconsin of a number of post-doctorate research fellowships, for the study of factors affecting the production of antibiotics and their action on human, animal and plant diseases.

The fellowships have been established for a three-year period, and will be assigned by the University to the departments of Agriculture, Bacteriology, Biochemistry, Plant Pathology, Veterinary Science and Botany, at Madison, Wisc.

The Fellows will be appointed by the University on the basis of proved ability in their fields and will receive salaries of $3,600 to $4,000 a year. The total of grants, including allowances for working expenses, will be approximately $110,000.

Fall Distribution of Streptomycin Planned

Limited commercial distribution of streptomycin probably will begin September 1, the Civilian Production Administration states. Plans have been drafted for September implementation, whereby streptomycin will be issued to selected hospitals throughout the country which will act as area depots.

Chester S. Keefer, Evans Memorial Hospital, Boston, reports that the amount of streptomycin needed for treatment of tuberculosis is so large that use of the drug must be limited to research.

Allocations of the drug for July totaled 42,831 grams, 11,180 designated for civilian use and research. Production in May was 38,750.9 grams, and June production was "lower than expected".

Styrene Plants Declared Surplus

Four styrene plants, built as a cost of $118 million, have recently been declared surplus by War Assets Administration, and have been offered for sale or lease.

The units included in the WAA offering, with operators bracketed, are at Kobuta, Pa. (Koppers Co.); Texas City, Texas (Monsanto Chemical Co.); Velasco, Texas (Dow Chemical Co.) and Los Angeles, Cal. (Dow Chemical Co.). Combined production tonnage is listed at 162,500 tons of styrene annually.

CALENDAR *of* EVENTS

AMERICAN CHEMICAL SOCIETY, semi-annual meeting, Chicago, Sept. 9-13.
AMERICAN GAS ASSOCIATION, Atlantic City, N. J., week of Oct. 7.
AMERICAN INSTITUTE OF CHEMICAL ENGINEERS, western convention, Palace Hotel, San Francisco, Aug. 25-28.
AMERICAN INSTITUTE OF MINING AND METALLURGICAL ENGINEERS will celebrate its 75th anniversary at the Waldorf-Astoria, New York, September 16-18, 1946.
AMERICAN OIL CHEMISTS' SOCIETY, 20th. annual fall meeting, Edgewater Beach Hotel, Chicago, Oct. 30-Nov. 1.
NATIONAL CHEMICAL EXPOSITION will be held at the Chicago Coliseum, Sept. 10-14.
PAINT INDUSTRIES' SHOW, in conjunction with annual conventions of Federation of Paint and Varnish Production Clubs, and National Paint, Varnish and Lacquer Association, Hotel Claridge, Atlantic City, Nov. 4-6.
INSTRUMENTATION CONFERENCE and Exhibit, Hotel Wm. Penn, Pittsburgh, Sept. 16-20.
VINGTIEME CONGRES DE CHIMIE INDUSTRIELLE, Paris, France, Sept. 22-28.

Adjust Lead Allocations For Insecticides

To maintain peak production of insecticides, the Civilian Production Administration has announced a temporary plan which will take care of the seasonal requirements of insecticide manufacturers by providing them with the quantities of lead they need at the time when they can put it into process.

During the period July 22 through September 30, insecticide manufacturers must receive written permission from CPA before using lead in making their products. Those manufacturers needing lead will receive the same amount as previously, but it will not be an automatic allotment.

The temporary plan was felt necessary to take care of the shifting third-quarter requirements of the insecticide industry. Because of changing seasonal needs, in this period many manufacturers make only lead arsenate. Other manufacturers at this time make only calcium arsenate, but under the allotment plan they would continue to receive lead which they do not need.

WAA Offers Magnesium Facilities

Two magnesium plants in Velasco and Freeport, Texas, leased and operated during the war by the Dow Magnesium Corporation and the Dow Chemical Company, have been offered for sale or lease by the War Assets Administration. The plants, designed to produce magnesium from sea-water and oyster shells by the Dow electrolytic process, are well located, of modern construction, and offer opportunities for diversified industrial or chemical manufacture.

Both the Freeport and Velasco units are offered for sale or lease, in whole or in part, with or without the magnesium facilities.

British Industrialists Visit Goodrich Headquarters

W. S. Richardson, president of Goodrich Chemical Co. Inc., plays host to British industrialists visiting the U. S. to study polyvinyl chloride resin production. Left to right: S. J. Skinner, British Geon Ltd.; J. J. P. Staudinger, Distillers Co. Ltd.; R. P. Kenney, B. F. Goodrich Chemical; Mr. Richardson; F. K. Schoenfeld, Goodrich Chemical, and F. Roffey, Distillers Co. Ltd.

Chemicals Wanted

The following chemicals are wanted by the National Registry of Rare Chemicals, Armour Research Foundation, 33rd, Federal and Dearborn Sts., Chicago 16.

Furane
4-Nitro pyrocatechol
o-Tolyl urethane
Uranyl formate
Indium telluride and selenide
Butoxy acetic acid
3,5-Diamino toluene
Propyl nitrate
Methyl nitrate
2,4-Dichlorobenzoyl K acid
Cellulose stearate
Phenyl sulfate
5-Hydroxymethyl furfural
Furfuryl mercaptan
Ethyl tetrasulfide
2,4-Toluene diisocyanate
Dioleyl maleate
1,2-Hexanediol
Ribitol
Hexamethylene glycol
Pentamethylene diamine

Establish Foreign Patent Libraries

Alien Property Custodian James E. Markham has announced that complete files of patents seized from German and Japanese nationals are now available in the patent departments of the Chicago and Boston Public Libraries and at the APC's San Francisco office.

The files are located in the main building of the libraries, and are arranged according to Patent Office classification.

The APC patent libraries were transferred to the public institutions as a result of the closing of APC patent division field offices in those two cities. Patent libraries are maintained by the APC at its Washington office in the National Press Building, its New York office at 120 Broadway, and now its San Francisco office at 417 Montgomery Street.

COMPANIES

Hercules Enters Fertilizer Field

The $14,000,000 ammonia plant at Lake Charles, La., formerly operated by Mathieson Alkali Works, Inc., under contract with Reconstruction Finance Corporation, has been leased to the Hercules Powder Co., Wilmington, Del., for ten years with rental fee based on percentage of net sales with a guaranteed minimum.

Solvay Buys Nitrate Plant

The $40,000,000 Buckeye Ordnance Works, South Point, Ohio, has been sold to the Solvay Process Co., New York, for $12,500,000, subject to the provisions of the Surplus Property Act and the applicable regulations issued thereunder by War Assets Administration.

Located six miles up the Ohio River from Ashland, Ky., the Buckeye facility, operated during the war by the Atmospheric Nitrogen Corp., comprises a land tract of 576 acres on which are 48 buildings with 414,894 sq. ft. of floor area. The plant was sponsored by the War Department and was erected by contract with the Ordnance Department to produce anhydrous ammonia and ammonium nitrate.

Solvay expects to employ about 400 persons in supplying the fertilizer manufacturing industry with ammonium nitrate solutions to be used in ammoniating superphosphate. At an expenditure of $1,000,000 the purchaser can equip the plant to produce solid ammonium nitrate. It can also be converted in part to produce methanol.

Phillips Returns to U. S. I.

E. C. Phillips, until recently a colonel with the U. S. Army, has been appointed manager of the recently created St. Louis-Kansas City division of U. S. Industrial Chemicals Inc.

Acetic Project on Auction Block

Plant "A" of the Holston Ordnance Works, Kingsport, Tenn. designed for the production of glacial acetic acid, acetic anhydride, and the concentration of dilute acetic acid, has been offered for sale or lease, in whole or in part, by War Assets Administration. The unit is offered for disposition only on the assurance that its chemical operations are to be continued.

Production capacity is rated at 1,440,000 pounds of anhydride, 3,200,000 pounds of concentrated acid, and 200,000 pounds of new acid, daily. The processes and much of the equipment are subject to private patent rights and controls, and new occupants will require operating grants.

Pennsalt Plans Western DDT Unit

The first plant for producing technical DDT in the far West will be installed at Portland by the Pennsylvania Salt Manufacturing Co. of Washington, according to company officials. The insecticide unit,

to be built in conjunction with the caustic-chlorine project now under way, is expected to be in production by next summer.

Most of the output will be sold in the western states with particular attention to be paid to Pacific coast export markets.

Cyanamid Revamps Corporate Structure

American Cyanamid Company, New York, has announced that the business of the American Cyanamid and Chemical Corporation, a subsidiary, has been consolidated with that of the parent company, American Cyanamid Company. This consolidation action is in line with the general plan for the simplification of the corporate structure of the Cyanamid organization and henceforth the business of the American Cyanamid and Chemical Corporation will be operated as the Industrial Chemicals Division of American Cyanamid Company.

A similar consolidation is planned with regard to Lederle Laboratories, Inc., Pearl River, N. Y., the Cyanamid unit which produces pharmaceutical and biological products for human and veterinary use.

Hooker-Detrex Form Solvents Corporation

The Hooker-Detrex Corporation, jointly-owned by the Hooker Electrochemical Company, Niagara Falls, N. Y., and the Detrex Corporation, Detroit, has been incorporated under the laws of New York State, for the purpose of manufacturing chlorinated solvents, the sale and distribution of which will be handled by Detrex.

The new company's site for manufacturing will be in the Northwest, where materials are available, and where the company will handle West Coast distribution.

Airco Buys Acetylene Plant

An acetylene plant in Portland, Ore., operated by Air Reduction Sales Co., has been sold to that firm for $130,300 by War Assets Administration.

The Portland plant is the eighth facility to be purchased by Air Reduction Sales. The others are seven small oxygen plants located in Emeryville, Calif., Flint, Mich., Rochester, N. Y., Milwaukee, Wis., Bettendorf, Ia., Baltimore, Md., and Lima, Ohio.

Armour Licenses General Mills

Armour & Co., Chicago, has issued a license to General Mills, Inc., New York, granting General Mills rights under Armour patents to operate a fats and oils chemical plant for the production of fractionated fatty acids from animal, vegetable and marine oils. The Armour fractionating processes will be used at a plant which General Mills will build at Kankakee, Ill. General Mills is the first to enter the field under the Armour licenses.

Goodrich Buys War-Built Rubber Plant

The first government-owned synthetic rubber unit to be sold has been purchased by B. F. Goodrich Co. from WAA for $4,250,000.

The plant, built at a cost of $10.7 million, and located at Louisville, Ky., has a rated capacity of 60,000 long tons of GR-S per annum, and was operated by Goodrich during the war.

Freeport Sulphur Earnings Up

Consolidated net income of Freeport Sulphur Company for the three months ended June 30, 1946, after all charges including depreciation, depletion and Federal income taxes, amounted to $944,414, equivalent to $1.18 per share on the 800,000 shares of common stock outstanding, Langbourne M. Williams, Jr., president, reported to directors.

These earnings compare with net income of $764,397, or 95 cents per share, for the second quarter of 1945. Freeport's portion of the earnings of its subsidiary, Cuban-American Manganese Corporation, amounted to $14,545, or 2 cents per share, compared with $149,195, or 19 cents per share, in the second quarter of 1945.

Heads G. E. Resins Department

John C. Morris, appointed superintendent of manufacturing of the resin and insulation materials division of General Electric Co.'s chemical department. Mr. Morris will be stationed at Pittsfield, Mass.

Hercules Profits Gain

The semi-annual report of the Hercules Powder Company shows net earnings for the first six months of 1946, after $2,321,-

406 taxes, of $3,629,885, equal, after preferred dividends, to $1.30 a share on 2,633,420 shares of common stock outstanding. This compares with $2,898,767, or $1 a common share for the initial half of last year. Net sales totaled $47,050,408, compared with $56,590,752, for the comparable sales period of 1945.

Carbide Income Up

Net income of the Union Carbide and Carbon Corporation for the quarter ended on June 30, last, was $14,189,269, equal to $1.53 each on 9,277,788 shares, after provision of $10,048,124 for estimated taxes, according to the report issued for publication.

This compares with the net income of $10,468,707 after $8,397,684 taxes, equal to $1.13 a share for the preceding quarter ended March 31, and with $10,009,480, or $1.08 a share, for the June quarter of last year when $24,789,767 was provided for taxes.

Heads Shohan Research

Norman Applezweig, formerly research consultant with American Home Products Corp., has joined J. B. Shohan Laboratories as research director. The Shohan organization was formed recently to engage in chemical and biological research.

Company Notes

Further expansion of the GENERAL ELECTRIC CHEMICAL DEPARTMENT with the formation of a metallurgy division is announced by Zay Jeffries, general manager of the Chemical Department. The new division, representing the third operating unit to be incorporated in the Chemical Department, will handle the sale of various types of permanent magnets and metallurgical products.

YORK CHEMICAL CO. has moved to larger quarters at 23 Dean St., Brooklyn 2, New York.

The HUNGERFORD RESEARCH CORP. has been merged with the Hungerford Plastics Corp. and plans expanded operations at its Murray Hill, N. J. plant.

CARBIDE AND CARBON CHEMICALS CORP. has recently completed construction of expanded facilities for the production of monoisopropanolamine, diisopropanolamine, and triisopropanolamine.

The business operated as BISON LABORATORIES, a partnership, located at 80 Leslie Street, Buffalo 11, New York, has been purchased by Bison Laboratories, Inc. The former partners of Bison Laboratories have become stockholders in the new corporation.

Louis Garfienkel has recently been elected president and director of the newly organized GARFIENKEL EXPORT CORPORATION, a Western Hemisphere Division of the Garfienkel Chemical Company.

THE PHOSPHATE MINING CO. has changed its name to Virginia-Carolina Chemical Corp., Phosphate Mining Dept., Florida Division.

ASSOCIATIONS

Chicago Chemists Elect

The following officers for the year 1946-47 were elected at the annual business meeting of the Chicago Chemists' Club:

President, J. K. Stewart; 1st vice-president, L. G. VandeBogart; 2nd vice-president, Paul E Wenaas; treasurer, Earl C Leamon; secretary, J. D. Ingle; trustees, W. Courtney Wilson, Paul Van Cleef, Llye O. Hill, and Herman Kerst, Jr.

Cifelli Heads Patent Group

Thomas Cifelli, Jr., patent attorney for Givaudan-Delawanna, Inc., was recently elected president of the New Jersey Patent Law Association, a new organization of which he was one of the founders.

In its first public statement, the group stated that it "intends to carry on discussions for keeping members abreast of new developments, to follow closely national legislation which affects the profession, inventors and the public, to provide library facilities for its members, and to hold periodic meetings at which they will be addressed by prominent authorities in the profession."

PERSONNEL

Monsanto Staff Changes

Monsanto Chemical Company has announced the promotion of Donald H.

Powers, director of textile chemicals sales development in its Merrimac Division at Everett, Mass., to director of the division's textile chemical department.

The promotion placed Dr. Powers in charge of sales, sales promotion and research activities of the department.

Nate L. Crabtree, former advertising agency executive recently made special assistant to general manager D. S. Dinsmoor of the Merrimac Division, has been named to take charge of sales promotion activities of the textile chemical department.

Sawyer Sylvester was named to head the department's technical section.

Derby Resigns From Cyanamid

Harry L. Derby announced his retirement on July 31st from the American Cyanamid Companies in order to devote more time to his personal affairs and other interests. Mr. Derby was president and director of American Cyanamid and Chemical Corporation; president and director of Jefferson Chemical Company, which is jointly owned with the Texas Company: president and director of Arizona Chemical Company, jointly owned with International Paper Company; and chairman of Berbice Company Limited of British Guiana, South America.

Too, he was vice-president and director of American Cyanamid Company, and vice-president and director of Southern Alkali Corporation, Southern Minerals Corporation, and Southern Pipelines Corporation, the three last-named companies being jointly owned with Pittsburgh Plate Glass Company.

Taylor Covers Bikini Bomb Test

Robert L. Taylor, CHEMICAL INDUSTRIES' editor, witnessed the atom bomb "Operation Baker" at Bikini on July 25. As one of the members of the technical press invited by the Navy to attend the Bikini trials, Mr. Taylor flew by special plane from Washington to the Coast and thence to the Pacific atoll.

A report covering Mr. Taylor's observations and interpretation of the significance of the tests will appear in a forthcoming issue.

American Potash Names New Directors

Membership of the board of directors of the American Potash & Chemical Corporation has been increased from nine to twelve, it is announced by Chairman W. J. Froehlich.

The new directors are B. R. Armour, V. A. Johnston and H. G. Walter, Jr., all of New York. Mr. Armour, who is president of The Heyden Chemical Corporation, New York, and a stockholder of A. P. C. & C., also was elected to the executive committee. Rudolph E. Vogel, of Glore, Forgan & Co., Chicago, also was named to the executive board.

Mr. Johnston is a director of The Heyden Corporation and vice-president of A. G. Becker & Co., Inc., New York. Mr. Walter is a member of the law firm of Fulton, Walter & Halley, Heyden counsel.

Cahall Promotes Export Trade

William L. Cahall, newly appointed sales manager of the Export Department of Hercules Powder Company, flew to Honolulu August 15 on the first leg of an eight month trip to the Hawaiian Islands, China, the British Crown colony of Hong Kong, the Philippines, Netherlands East Indies, Singapore, India, and the Union of South Africa.

While abroad, he will re-establish distribution outlets for Hercules products, and appoint distributors for some of the company's newer products, especially toxic agents for insecticides and synthetic resins, which were not exported extensively in pre-war days.

Mathieson Staff Transfers

Appointments to four newly created sales posts and rearrangement of one New England and two Southern sales areas have been announced by D. W. Drum-

mond, general sales manager of The Mathieson Alkali Works.

Harold R. Dinges has been named district sales manager of one of the new southern sales areas and will direct its activities from headquarters at Charlotte, N. C. He will supervise company sales activities in Virginia, North and South Carolina and parts of West Virginia and Tennessee.

O. J. Theobald, Jr., a member of the Mathieson organization since 1932 as sales representative, has been named to assist Mr. Dinges.

Fred O. Tilson, district sales manager of the second newly defined southern area which will be serviced from Chattanooga, Tenn., will supervise company sales activities in parts of Tennessee, Alabama and Georgia.

William H. Eastburn heads the newly defined New England sales area as district sales manager and will direct sales activities from headquarters at Providence, R. I.

Joins Bechtel Bros.-McCone

Gordon B. Zimmerman, formerly with Universal Oil Products Co., has joined Bechtel Brothers - McCone Co., Los Angeles. Mr. Zimmerman will specialize in the design and construction of petroleum and chemical processing facilities.

Personnel Notes

BERRIEN EATON, president of Eaton-Clark Co., Detroit, has been named to the Order of the British Empire, in recognition of his services as chairman of the Michigan Committee of the British War Relief Society.

RALPH L. STEPHENSON has been named head of the chemical department of Marsman Company of California, San Francisco. Mr. Stephenson formerly was with the Merchants Chemical Company, New York.

AMBROSE R. CHANTLER, who has been director of domestic dyestuffs sales for the Du Pont Company since 1929, assumed the new position of general director

of sales of the dyestuffs division on August 1. Mr. Chantler will be succeeded as director of domestic dyestuffs sales by ERIC J. MONAGHAN, who has been assistant director since 1934.

VANCE N. WILSON, recently separated from the Armed Forces, has been named supervisor in charge of tank cars in the traffic department of the Pennsylvania Salt Manufacturing Company, it was announced recently.

CALVIN R. MACBRIDE has been appointed assistant manager of the products division of Du Pont's Plastics Department, effective about August 1. He has been assistant manager of the industrial division since 1929.

Beattie Joins Mann

Wesley Beattie, recently a major with the U. S. Army, has joined George Mann & Co., Inc., Providence, R. I. He will be headquartered at Stoneham, Mass.

Appointment of ELMER F. SCHUMACHER as director of sales of the Du Pont Company's Ammonia Department and HARRY R. DITTMAR as assistant director is announced by WALTER DANNENBAUM, general manager of the department.

Appointment of ARTHUR H. BURKHARDT as manager and FREDERIC B. SACKETT as assistant manager of the Du Pont Photo Products plant in Parlin, N. J., has been announced recently.

Onyx Oil & Chemical Company, manufacturers of textile, leather and industrial chemicals, announces that CLIFFORD R. SMITH, Onyx Southern sales representative before his entry into military service, has re-opened his office in Atlanta at 231 Healey Building. Major Smith served with the Chemical Warfare Service and will now represent Onyx in Alabama, Georgia, Tennessee, Florida and Mississippi.

LESTER D. BERGER, JR., has recently been appointed manager of a new Seattle office

for Carbide and Carbon Chemicals Corporation, located at 2901 First Avenue South. Mr. Berger has been with the organization since 1940 and before the war was located at the Company's main office in New York.

SIDNEY SUSSMAN, formerly chief research chemist of The Permutit Company, has joined the Liquid Conditioning Corporation, 423 West 126th Street, New York City, in the capacity of chief chemist.

Marvin Lane, formerly research chemist group leader with The Permutit Company, has also joined the Liquid Conditioning Corporation.

The Velsicol Corporation has appointed FRANK CAMPBELL PETERS to its eastern sales staff. Mr. Peters will make his headquarters at the company's eastern offices, 11 Park Place, New York, and will handle the company's line of hydrocarbon resins, aromatic solvents, and insect toxicants in the eastern territory.

NEWS *of* SUPPLIERS

W. F. Moore has joined the DAVIS FILTRATION EQUIPMENT COMPANY, INC., 60 Wall Street, New York City, as vice president in charge of manufacturing and technical director on filter processes, it was announced this month by Gordon Davis, president. Mr. Moore was formerly vice president of American Seitz Filters (now Republic Filter).

The appointment of the FAVILLE-LEVALLY CORPORATION, 105 W. Adams St., Chicago 3, Ill., as Chicago district representative, has been announced by the Hammond Iron Works, Warren, Pa., designers, fabricators and erectors of steel storage tanks for liquid and dry storage.

ROBINS CONVEYORS, INC., Passaic, New Jersey, manufacturers of materials handling machinery announces that its Philadelphia office, formerly at 12 South 12th Street, will be consolidated with that of its parent organization, Hewitt-Robins Incorporated at 401 North Broad Street, Philadelphia 8, Pennsylvania, effective September 1st.

Appointment of Harvey E. Schroeder, formerly district sales manager in Los Angeles for THE PARKER APPLIANCE COMPANY, to be manager of a newly-created Pacific Division of the company is announced by S. B. Taylor, president.

At a recent stockholders' meeting of the CROSBY STEAM GAGE AND VALVE COMPANY, Boston, Massachusetts, William P. Husband, Jr. was elected president and treasurer. Mr. Husband is also president and treasurer of the Ashton Valve Company of Cambridge, Massachusetts.

The H. K. PORTER COMPANY, INC., builders of locomotives, equipment for the processing industries and oil fields announces that its Boston office has been moved from 38 Chauncy Street, Boston 11, Mass. to the new location at 294 Washington Street, Room 735, Boston 8, Mass.

R. W. Gillmore has been named manager of a new branch office of the ALLIS-CHALMERS MFG. CO., Milwaukee, Wis., opened in the Claremount Hotel Bldg., Evansville, Ind., according to an announcement by J. L. Singleton, manager of district offices.

The Gas Processes Division of THE GIRDLER CORPORATION, has announced the opening of a southwestern office at 601 Central Building, Tulsa, Oklahoma. The southwestern representative of Gas Processes is J. D. Gordon, formerly the Division's eastern representative.

OWENS-ILLINOIS GLASS COMPANY has acquired the business and assets of Kimble Glass Company of Vineland, New Jersey. The business will be continued and operated by a wholly owned subsidiary known as Kimble Glass Company. The present management will remain in charge, and the offices of the company will be at Vineland, New Jersey.

CHEMICAL SPECIALTIES NEWS

Unique Chemical Seed Treating Method

A new and improved way to treat seed corn against disease and decay—the slurry method—has been developed by the Du Pont Company.

This development, following several years of laboratory, greenhouse, and field tests by engineers and plant pathologists of the company's seed-disinfectant research laboratory, required the design and construction of a new type of seed treater, as well as a specially formulated powder, known as "Arasan" SF fungicide.

The slurry method involves the application of the chemical disinfectant in the form of a water suspension that coats each seed with a protective slurry of the consistency of ordinary buttermilk, thus eliminating flying dust and the need for the wearing of masks by workmen during treating operations. Another advantage over the usual dusting operation is the greater accuracy and uniformity of the dosage.

The new mechanical device, called the slurry treater, synchronizes the flow of the seed and the slurry so that every bushel of seed receives the same accurate amount of the disinfectant. The active ingredient is tetramethyl thiuram disulfide.

Herbicide Lauded as Ragweed Control

Experiments conducted at the New York State Agricultural Experiment Station have revealed that spraying ragweed with the selective herbicide 2,4-D prevented the development of pollen—one of the most common sources of hayfever.

Water sprays containing one-tenth per cent of 2,4-D and five-tenths per cent of Carbowax were effective when applied at the rate of 100 to 200 gallons to the acre. It was also found that 2,4-D could be effectively applied as a "fog", using an oil solution of the material in a Todd fog applicator. This method has the advantages of swifter application and lower cost and of requiring much smaller volumes of solvent.

Public Health Service Buys Surplus Insecticides

More than 300,000 pounds of powdered, and 52,000 gallons of liquid DDT insecticide, widely used by the Armed Forces during the war and now declared surplus, have been sold to the U. S. Public Health Service for $221,165.96, War Assets Administration reports.

USPHS officials said the insecticide will be distributed to state health authorities for the control of malaria and communicable diseases such as typhus and infantile paralysis. It also will be used as a preventive measure agains possible carriers of yellow fever, dengue and bubonic plague.

It is estimated that DDT requirements of the USPHS will approximate one million pounds this year, so that surplus supplies provided the only readily obtainable tonnage.

Joins Mathieson Alkali Specialty Division

J. L. Pickens, recently discharged from the Navy, has returned to the specialties division of Mathieson Alkali Works. He will make his headquarters in Houston, Texas.

Onyx Oil Acquires New Plant

Onyx Oil & Chemical Co. Inc., Jersey City, has acquired additional production facilities at St. Charles, Staten Island.

The new plant, located on an eight acre tract, is expected to be in operation this month. Schedules have been set up for manufacturing resin emulsions, quaternaries, and alkyl naphthas.

Penco Markets New Weedkiller

Pennsylvania Salt Manufacturing Co., Philadelphia, has recently begun distribution of Penco 2,4-D weedkiller packed in 24-ounce cans and 50-pound drums.

The white powder, which contains about 70 per cent 2,4-D, is mixed in a water spray for use in the ratio of 1¼ pounds per 100 gallons of water. From 200 to 300 gallons of spray is sufficient to treat an acre.

New Insecticide Base Offered

Pyrin D20, a general-purpose insecticide concentrate which gives a finished space spray containing 3% of Improved Pyrin #20 and 1% of technical grade DDT when diluted at one part concentrate plus 19 parts base oil, has been announced as a new product of John Powell & Co. Inc., One Park Avenue, New York.

Pyrin D 20 makes a finished space spray by merely mixing it with base oil. It eliminates the use of special weighing or mixing equipment, or auxiliary solvent.

Used at the recommended dilution, the finished spray gives knockdown on flies equivalent to a 5% pyrethrum extract plus practically 100% kill. It is effective against most household crawling and flying insects.

Dallas to Have First Purex Plant

Construction is well underway in Dallas on a $250,000 bleach manufacturing and distributing plant for the Purex Corporation, which will be the first of its kind in the Southwest.

The unit will serve all of Texas, part of Oklahoma, New Mexico, Kansas, Louisiana, and Mississippi. This area was formerly dependent on factories in St. Louis, Missouri, and South Gate, California, for the Purex bleach.

A. G. Bruce, southern divisional sales manager, has been named manager of the new Dallas plant.

Edco Markets Aerosol Bomb

A new five pound aerosol bomb, with a vapor capacity of 750,000 to 1,250,000 cubic feet, is being introduced by the Edco Corp., Newark, Del. The dispenser, equipped with a handle grip for easy use, can eject an eight foot atomized mist.

Present production is confined to two DDT-pyrethrum formulations, with the manufacture of larger units scheduled for the near future.

Novel Wetting Agent Modification

Service Industries, Philadelphia, has recently completed plans to expand the marketing of its specialty product, Stik-gum, the formulation of which has been approved by the addition of a bactericidal agent.

Sold in capsule form, Stik-gum is added to water solutions used in sealing machines for moistening glued adhesive paper, envelopes, etc.—to improve wetting speed.

The bactericide is claimed to ensure the maintenance of a sterile solution and eliminate glue-based odors.

Naugatuck Introduces Seed Preservative

A new specialty, developed by Naugatuck Chemical Division, U. S. Rubber Co., is designed to protect corn and leguminous seeds in storage against decay

and damage from weevils, grain moths and other insects. One application of the chemical, immediately after harvesting the seed crop, is claimed to yield double protection—by destroying insects and fungi during the winter storage period, and by checking soil fungi when the seed is planted in the spring.

The compound is a combination of the organic fungicide Spergon and DDT, and is marketed in the form of a light yellow powder which adheres uniformly to seed for from eight to ten months.

Begin Anti-Malarial Production

Winthrop Chemical Co. Inc., has begun commercial production of Aralen, a new anti-malarial drug, at its Albany, N. Y. plant. A stockpile of tablets is being formed for general use in the U. S. and quantities are being shipped to South America, Puerto Rico, and the Middle East.

Aralen is claimed to be superior in several respects to Atabrine. Chemically, Aralen is 7-chloro-4(4-diethylamino-1-methylbutyl-amino) quinoline diphosphate, and was one of 14,000 chemicals tested by the National Research Council during the war.

New Urea Resin Adhesive

A new type, liquid urea-resin glue, of use as a replacement for currently short animal casein glues has been introduced by the Casein Company of America, Division of the Borden Company.

Marketed under the name of "Casco-Resin 135", it is a free flowing liquid resin of the urea-formaldehyde type. Easy to handle and use, it is designed primarily for cold (room-temperature) gluing. Setting or curing of the adhesive is accomplished by the addition of a catalyst. Especially compounded to minimize the crazing tendency of urea-resin, it is claimed that the product provides a much more durable bond than conventional adhesives, and also makes an excellent bond on certain woods that are not easily glued with urea-resin.

Hawkins Heads Sterling Subsidiary

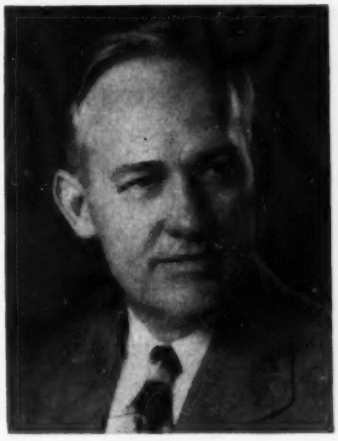
Appointment of John M. Hawkins as president of the American Ferment Company, Inc., a subsidiary of Sterling Drug Inc., has been announced by James Hill, Jr., president of the parent company. Mr. Hawkins was formerly vice-president of the subsidiary.

Plan Export Insecticide Sales

Organization of the export sales department of the National Agricultural and Metallic Pulverizing Company of Elkton, Md., specializing in DDT mixtures, was announced this month. The company is now preparing to distribute quantities of the insecticide to Central and South America and throughout farming sections of the United States.

Richard Heubner has been appointed director of research into new concentrations and combinations of the insecticide for Latin export trade.

Karch Joins Hall Staff



Herbert S. Karch, appointed technical sales representative by the C. P. Hall Co., Akron. Mr. Hall will assume part of the responsibilities held formerly by Arthur E. Warner, late Hall vice-president.

Pilot Plant Novel Insecticide

E. I. du Pont de Nemours & Co., Inc., and Pennsylvania Salt Manufacturing Co. have begun pilot plant production of hexachlorocyclohexane, the insecticide developed in England during the war. (C. I. p. 133, July, '46).

The new insecticide—known more commonly as 666—holds promise for the treatment of cotton insects and certain types of locust.

Chapman Enters Agricultural Field

Chapman Chemical Co., Chicago, until recently known as A. D. Chapman & Co. Inc., has recently formed an Agricultural Chemical Division which will operate under the direction of Robert C. Harnden.

Mr. Harnden, formerly manager of Dow Chemical Co.'s Dowicide Division, states that the initial agricultural line will consist of relatively new chemical specialties, such as selective weedkillers, soil fumigants, and insecticides.

Millard Named Stanco Sales Head

A. J. Millard has been named to the newly-created post of manager of the sales and advertising departments of Stanco, Inc., subsidiary of the Standard Oil Company (New Jersey).

CANADIAN NEWS

Canada Major U. S. Chemical Market

The U. S. A. supplied 89.4 per cent of Canada's $79.8 million imports of chemicals and allied products during 1945 according to an official report. Imports from the United States in 1938 were only 63.5 per cent of the total.

Imports for 1945 by main groups, and in millions of dollars were: Acids, $3.3; alcohols (industrial), $0.3; cellulose products, $5.3; drugs and pharmaceuticals, $9.4; dyeing and tanning materials, $8.3; explosives, $0.9; fertilizers, $3.7; paints and pigments, $8.7; toilet preparations, $0.4; soaps, $0.4; inorganic chemicals n. o. p., $11.3; other chemicals, $28.2.

Import values were higher than in 1944 in all but four groups, namely alcohols, explosives, fertilizers and inorganic chemicals n. o. p. Dollar value of U. S. A. imports into Canada rose to nearly three times normal prewar totals. The wartime growth of the Dominion's chemical industry coupled with continuing heavy chemical consumption indicate that U. S. A. chemical exports to Canada will continue at a high level. Interesting results for 1946 imports may result from the recent restoration of parity between Canadian and American currency and the removal of price ceilings in the United States.

Harrisons & Crosfield Broaden Technical Service

Harrisons & Crosfield (Canada) Ltd., importers and distributors of chemicals and industrial raw materials, has recently completed construction of a modern well-equipped laboratory in Toronto coincident with the establishment of a Technical Division.

The principal functions of the new Division, under the direction of Sheldon Sneyd, will be to assist the company as a whole in making the fullest use of the technical service provided by various principals (e. g. Hercules Powder); to standardize and maintain uniformity in the quality of imports; and to expand sales outlets by assisting customers with technical problems.

Pearl Essence Production Planned

Plans are under way for the formation of a company to manufacture pearl essence from the scales of herring caught in New Brunswick waters.

Used to make artificial pearl jewelry, and decorative ornaments, no natural or synthetic essence has been made in Canada heretofore, and the fish scales have been sold to U. S. concerns for processing.

Million Dollar Malting Plant

A new malting industry for Port Arthur, Ont., calls for the purchase of a large elevator for storing barley and erection of a plant for processing purposes.

Total expenditure for the project will be well in excess of $1 million.

Named to C.I.L. Directorate

Crawford H. Greenewalt, named to the board of directors of Canadian Industries Ltd. Mr. Greenewalt is a director and vice-president of E. I. du Pont de Nemours & Co. Inc., C. I. L.'s U. S. affiliate.

Plan Domestic Pliofilm And Airfoam Production

Goodyear Tire & Rubber Company of Canada has started construction of two buildings valued at $2 million for the manufacture of Airfoam and Pliofilm. The new plants with a total floor space of 85,000 sq. ft., will add about 150 additional employees to the main Goodyear payroll at New Toronto.

Formerly Airfoam and Pliofilm were available to a limited Canadian market through an agreement with the parent Akron plant. Now production in Canada will make Airfoam—used for sponge-like mattresses and seats — and Pliofilm — a food packaging medium — available to a broader market.

Chemical Output For 1945 Firm

A preliminary report issued by the Bureau of Statistics on Canada's chemicals and allied products industries for 1945 indicates a production selling value of $472.3 million, a decline of 35% over 1944. The lowered output was a direct consequence of the war's end resulting in the termination of activities of several large war plants. Aside from the ammunition program, the chemical industries 1945 output was $372.1 million, 139% above the 1939 figure.

The chemical and allied products industry operated 983 plants, a slight increase over the previous year, and employed over 59,000 workers, a 24% reduction compared with 1944. Expenditures for salary and wages totalled $100 million; raw material cost at works $200 million; fuel and electricity $16 million.

Greater output values than in 1944 were recorded by six industries with selling value of products in millions of dollars, as follows, and percentage gain over the preceding year in brackets: medicinals and pharmaceuticals $58.8(5); soaps, washing compounds and cleaning preparations, $36.6(11); fertilizers, $36.2 (16); adhesives, $5.8(3); coal tar distillation, $5,7(0.6); inks, $4.9(4).

Those industries producing products whose selling values declined include heavy chemicals, $72.4(11); paints, pigments and varnishes, $46.5(5); toilet preparations, $17.5(2); compressed gases, $8.4(5); polishes and dressings, $7.3(0.4); hardwood distillation, $1.4(8); miscellaneous, $170.9(60).

Many former war plants have been transformed into private companies resulting in a strong endeavour being put forth by producers to utilize this expanded capacity.

Newsprint Output And Price Up

The first six months of 1946 brought an increase of 29.7% in newsprint production over the similar part of 1945, and an increase of 30.4% in shipments for the same period. Canadian production for the month of June 1946 was 334,207 tons (an increase of 24.9% over June 1945). Shipments to the United States in June 1946 were up 37.7% over June 1945 and 55% over June 1939.

Being a world commodity, newsprint tends to have a world price. Most Canadian manufacturers have now announced an increase of $6.80 a ton in the standard price of newsprint to U. S. and Canadian customers, and an increase of 10% in pulp prices to United States consumers. These moves follow the recent revaluation of the Canadian dollar, which resulted in a reduction of approximately 10% mill net on company sales payable in U. S. funds. The recent increase in freight rates, plus higher wood and labor costs, have also added to the higher prices. Latest price announced is $73.80 a ton for newsprint delivered in New York City (the price in Canada is $69.80).

In 1934 the price of newsprint was $40.00 a ton, and it was $50.00 in 1939.

MARKET OUTLOOK

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Ample Supply of Tin Two Years Away

Despite an apparent improvement in current tin supplies, government officials are now convinced that a full balance of supply and demand will not be reached until 1948. Earlier this year it had been felt that the return to unrestricted consumption might be delayed until mid-1947. Now, however, unpublicized tin reports based upon studies in the Far East have led experts to conclude that ample supplies of the metal will not be available until 1948.

The continued shortage will be due largely to two factors. They are, widespread political unrest in the Far East, particularly in the British and Dutch possessions, and the frequently prohibitive cost of mining equipment.

Supplies of virgin tin in sight for 1946 are estimated at 65,000 tons, and CPA had planned earlier to make stockpile releases at the rate of 2000 tons monthly, but this has since been pared to a 1500 ton level.

Gradual relief in the shortage is due during the next six months, with a step-by-step easing of curbs likely to follow through 1947, provided that no unexpected interruptions in supply shipments are encountered. However, it will be a full two years before a free market exists.

Shellac Market Enters Speculative Phase

A real question exists at present as to the future of shellac, particularly in view of the fact that last month prices hit a postwar high at Calcutta—the only exporting port. Some dealers predict a continued rise, but others feel that the peak has been reached and that a stabilization, and possible easing in price is in prospect. Both schools of thought can summon supporting arguments, but the only concrete statement which can be made is that the shellac market is currently highly speculative.

During the war all India's shellac was purchased under direction of the government at a ceiling price of $22.43 per pound for shipment to allied countries. These controls were removed on last May 25, but shellac prices had begun an upward swing in December, and have been climbing ever since.

Favoring a high price market is the fact that world demand for shellac has risen markedly in the past few years—and such demand continues at a high level. Actually, the U. S. accounts for two-thirds of world shellac purchases, and demand here can play a prominent part pricewise. However, Great Britain is also seeking much more shellac than in prewar days, to further support the market. Too, there is a credible suggestion that recent sharp advances in Calcutta quotations have resulted from the action of "financial interests" who are seeking to corner the market, in anticipation of being able to manipulate prices.

At the moment, importers anticipate that shellac prices will be quite well maintained for at least the next few months, but some levelling off appears inevitable over the longer term. Consumer price resistance has been developing, and the entrance of synthetic plastics into the phonograph record field—one of shellac's major outlets—cannot be discounted.

Market Review

Heavy Chemicals—Despite the initial removal of OPA regulations, chemical manufacturers, by and large, continued to hold the line against advanced quotations, but prices placed on occasional resale lots reflected the extremely firm position of the market.

Maximum pressure was evident in alkalies, with parcels of caustic soda commanding a fancy ten cents a pound and soda ash soaring to 6 cents. Sodium bicarbonate was virtually unobtainable; trisodium phosphate and sodium bichromate offerings were few in number. Little prospect of any material easing in this category is expected during the calendar year.

Quotations on xylol, toluol, and high flash naphthas were pared by petroleum companies—dropping an average of seven cents a gallon. This is the first modification in market price in these commodities in several years. Other solvents, notably ethyl, methyl and amyl alcohol, were closely held, although sizable shipments have been booked by both the paint and anti-freeze industry.

Muriatic, nitric, and sulfuric acid supply seemed to be capable of meeting immediate demand. White lead, red lead, chrome yellow, and chrome green moved up pricewise. Naval stores advanced sharply with gum products selling slighly below wood derivatives. Oxalic acid remained well sold ahead.

Phenol and naphthalene quotations also rose, together with basic fertilizer components. Ammonium sulfate moved to $30 ton, and tankage prices increased. This latter item has been in short supply as a result of reduced slaughterings. Copper sulfate remained steady, with the peak for domestic consumption past, but export inquiries in excess of 15,000 tons were received during the month. Nickel sulfate, and nickel salts, were reasonably available, with increased output, but heavy platers' needs took up the slack.

Fine Chemicals—Silver salts moved up sharply, but some easing may develop as Treasury stocks of the base metal are released. Little synthetic camphor was offered, and menthol continued firm. Vanilla and eugenol were difficult to obtain, but a large Mexico crop of vanilla beans is scheduled to be harvested within the next few months. Gum arabic stood at 16 cents, well supported by high Egyptian quotations on replacements. Tragacanth, likewise, commanded fancy prices.

Tartaric acid moved steadily, even though imported material sold 2 cents below the domestic product. Bismuth preparations were tight, reflecting the position of the metal, with glycerin holding at 21 cents. Some reports indicated that higher spot prices were being paid for this commodity—ranging up to 40 cents.

The mercury, and mercury salt, market was soft, but stearic acid prices ascended as a result of the trend in tallow. Lanolin presented an unsettled appearance, with a suggestion that price modifications may be in the offing.

DDT was well sold ahead, with but little interest being shown in odd lots at 52 cents. A state of flux exists in this category, which will bear watching. Potassium permanganate firmed at 50 cents, and the lack of inclination of Norwegian exporters to resume shipments of cod liver oil caused some speculation as to the future trend in this commodity.

Quinine Prospects Promising

Possibilities for the revival of quinine production in the Netherlands East Indies are now considered excellent on the basis of reports received from Java and Sumatra. Indications are that the industry has suffered less war damage than any other in the Indies.

The stands of cinchona trees, from the bark of which quinine is derived, were kept in good condition during the Japanese occupation and installations for the extraction of quinine were actually increased.

Present indications are that a return to production at prewar capacity—the Indies supplied some 95 percent of the world supply—can be realized as soon as general conditions approach normalcy.

Java's lone prewar quinine factory at Blandoeng, although in good condition, is not as yet operating as a result of the existing labor shortage. It has on hand about 700 metric tons of quinine—representing almost one third annual world consumption.

In addition, two other quinine extracting units, which the Japanese built in September and October, 1943, by stripping machinery from local tea and sugar factories, are now operating. One of these is at Soekaboemi, 50 miles west of Bandoeng, and the other at Garoet, 30 miles southwest of Bandoeng.

The first mentioned plant has a rated capacity of 115 tons a month, and the latter 100 tons. Last July, the last month of full production before the Japanese capitulation, they operated at 90 per cent of rated capacity.

Casein Outlook Not Immediately Encouraging

In spite of the recent sharp advances in casein prices, little real improvement in the supply position of this commodity can be expected, at least until the fall, according to trade circles. In essence, the needs of U. S. industry are estimated at some 80 million pounds this year, and there is little likelihood that domestic output will exceed 20 million pounds.

Circumstances in Argentine—one of the U. S. major sources of supply—are likewise far from encouraging. Milk output has declined, and world casein demand has increased. Russia, England, Sweden, and Norway have all placed substantial orders with Argentine producers. In addition, New Zealand and Australian output has been pared.

In both the U. S. and Argentine, it is apparently more profitable to turn out skim milk, cheese, and other edible food products rather than casein. Until the world-wide food demand tapers, there is but little prospect of heavy tonnages of casein being available.

One promising feature does appear on the horizon, however. Some resistance has been developing to high casein prices. Many consumers are experimenting with, and using, soy bean protein and resins as casein replacements. Producers are not unaware of this trend, and may modify production schedules to forsake immediate profit in the interest of retaining a firm hold on a market which consumed 48 million pounds of domestic product a few years ago.

Such action appears on the horizon. It may well crystallize soon.

Natural Gum Prospects Improve

Although continued shortages in the supply of most natural resins are in prospect, at least for the next several months, and in some cases may extend well into 1947, there are indications that some war-scarce gums will be reaching the U. S. soon.

Gums such as Singapore Damar, Pale East India, Batu, and Black East India, and Pontianak, all originating in Singapore, are again being produced, and U. S. importers have placed orders and are hopeful of receiving consignments. Prices, however, are expected to average 75 per cent above those which prevailed before the war.

The Dutch Government is making every effort to reestablish gum output in the Dutch East Indies, but this market is lagging behind Singapore. Batavia Damars are among the more important gums required by U. S. consumers, and prices are scheduled to be considerably higher than formerly.

In the Philippine Islands,—source of Gum Elemi, etc.—war damage and inflation both militate against early shipments, or low quotations. Quite some period will elapse before offerings are available.

The outlook for Congo gum, available throughout the war, is adversely affected by high prices in the foreign market, as a result of world demand, plus heavy taxes assessed by the Belgian government. Offers have been temporarily withheld, pending the outcome of discussion between exporters and the government. Unless prices are pared Congo gum will be non-competitive with synthetic resins.

Fertilizer Producers Schedule Increased Output

Current indications are that nine percent more fertilizer will be available for agricultural use in 1946-47 than was produced during the past crop year. The supply outlook is up for all three of the major nutrients, with superphosphate holding the brightest position.

It is estimated that nitrogen output will gain some two per cent with potash due to register a five per cent gain. Phosphoric acid, as superphosphates, is scheduled to be produced in a tonnage 14 percent above last year.

CHEMICAL ECONOMICS & STATISTICS

Phosphate Rock Output At New High

Several new records were made in the domestic phosphate rock industry in 1945 according to reports submitted by operators to the Bureau of Mines, United States Department of the Interior. Total mined production reached a new high at 5,399,739 long tons, and the quantity mined in Florida (3,814,935 tons) and the Western States (323,955 tons) were also new records.

Phosphate rock sold or used by producers in 1945 also made a new peak of 5,806,723 tons, over four hundred thousand tons greater than in 1944, with a value of $23,951,077, in turn about 3 million dollars above the 1944 value. The marketed production from Florida and also the Western States was also greater than ever before. Sales of Tennessee rock were less. Imports again increased markedly reaching 141,658 long tons. Exports were greater by about 50,000 tons.

Apparent domestic consumption reached nearly five and one-half million tons. Stocks at the end of 1945 had decreased about one-third, the decline being chiefly in Florida. The P_2O_5 content of the domestic phosphate rock sold or used in 1945 was at a new high—1,884,035 long tons.

Unsatisfactory conditions still prevail in the world's phosphate rock industry, and appear likely to continue for a considerable time. Rehabilitation of the industry in the former major producing countries in Africa and the Far East has been slow. The situation resulting from the shortage of phosphate supplies due to these delays is aggravated by the threat of famine in many countries.

In the United States the production of phosphate rock is still supported by the Government guarantee of 90 percent parity to farmers, together with the demand for export crops and fertilizer for export. The abnormal domestic production and consumption of phosphate rock may be expected to continue pending recovery in other producing areas, the satisfaction of demands from non-producing phosphate-consuming countries, the disappearance of the famine threat, or major financial difficulties.

Process Tankage Fertilizer Production Declines

Figures on the production of process tankage fertilizer for the four years ended April 30, prepared by the U. S. Department of Agriculture's Research Administration, show that the output has decreased steadily because of the falling off in supply of the raw materials, which are by-products of various industries.

A great part of process tankage is made by treating such wastes as leather scrap, feathers, spent glue stock, and felt trimmings under steam pressure with or without sulfuric acid. The final product contains on the average about 8.5 percent nitrogen, mostly insoluble in water, but when placed in the soil becomes slowly available to crops.

The Department's computations show the following production in short tons for four May-to-April years:

1943	104,614
1944	101,300
1945	90,638
1946	87,695

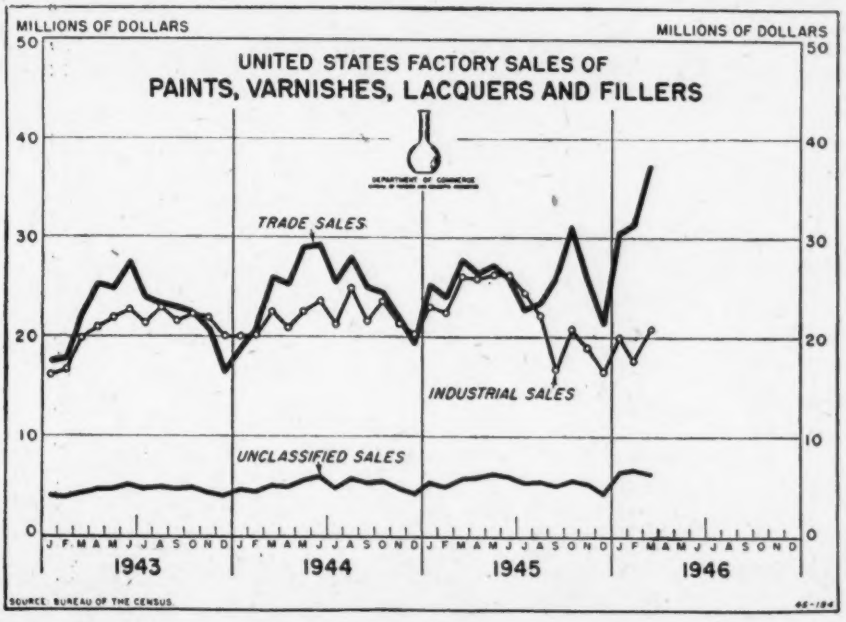
Although production has decreased somewhat, there has been sufficient demand for process tankage so that much more could have been sold during the past four years had it been available. The total output for 1945 and 1946 came from eight plants.

PLASTICS AND SYNTHETIC RESINS

Item	Shipments and Consumption (In pounds) April 1946	March 1946
Cellulose acetate and mixed ester plastics:[1]		
Sheets:		
Continuous (under .003 gauge)	696,486	656,114
Continuous (.003 gauge and upward)	664,833	677,978
All other sheets, rods and tubes	500,693	417,599
Molding and extrusion materials	7,181,193	6,503,781
Nitrocellulose plastics[1]		
Sheets	1,048,108	911,081
Rods and tubes	665,853	609,841
Phenolic and other tar acid resins:		
Laminating (dry basis)	2,404,966	2,052,005
Adhesive (dry basis)	1,258,188	1,194,389
Molding materials[1]	12,483,690	12,286,204
All other (dry basis)[2]	5,314,081	4,229,231
Urea and melamine resins:		
Adhesives (dry basis)	3,314,027	3,224,959
Textile and paper treating (dry basis)	1,012,742	1,034,940
All other (dry basis)[2]	186,583	130,296
Polystyrene	4,950,626	4,011,334
Vinyl resins:		
Sheeting and film[1]	2,243,370	2,161,230
Textile and paper coating resins (resin content)	1,436,258	1,688,890
Molding and extrusion materials (resin content)[3]	5,265,325	r4,718,281
Adhesives (resin content)[4]	[5]1,804,105	[6][7]1,276,241
All other (resin content)[2]		
Miscellaneous plastics and resins:		
Molding and extrusion materials[1][8]	5,439,045	5,434,228
All other (dry basis)[2][9]	3,072,620	2,731,042

r Revised.
[1] Includes fillers, plasticizers and extenders.
[2] Excludes data for protective coating resins.
[3] Formerly included fillers, plasticizers and extenders on which basis April figures would be 7,108,981 pounds, and March figures 6,664,970 pounds. April figures as shown were collected on resin content basis and March figures revised to comparable basis. Future statistics will be collected on resin content basis as shown here.
[4] Cannot be shown separately without disclosing the operations of individual establishments.
[5] Proportion of estimate, 2.8 per cent.
[6] Proportion of estimate, 4.7 per cent.
[7] Revised to exclude the operations of one plant which erroneously reported vinyl adhesives. This revision has but small effect on the comparability of the combined figures for adhesives and all other vinyl resins.
[8] Includes data for ethyl cellulose, urea and melamine, acrylic acid and miscellaneous molding and extrusion material.
[9] Includes data for petroleum resins, acrylic acid, ester resins, mixtures and miscellaneous synthetic resin materials.

(*Source: Bureau of the Census*)



Pulp-Paper Output Maintained

Production of pulp, paper and board maintained in May the high level previously set in March and April, 1946. Total production of paper, paperboard and building board amounted to 1,620,157 tons, less than 9,000 tons under the April record, according to the regular monthly

report released recently by the Bureau of the Census.

Receipts of pulpwood in May were 1,341,704 cords, a decline of approximately 91,000 cords from the April figure. The sharpest decline occurred in the South, where 574,236 cords were received, as compared with 727,183 cords in April. Pulpwood consumption increased with the result that a decline in national inventories of some 182,000 cords took place during the month.

May receipts of fibrous materials other than pulpwood were 36,000 tons lower than in April. Receipts of waste paper were some 16,000 tons lower during the month.

Domestic production of wood pulp was 904,354 tons in May, about 3,000 tons under April. Wood pulp consumption in paper and paperboard manufacture at 1,030,505 tons was also lower by about 15,000 tons. However, the consumption rate was sufficiently high to result in withdrawals of 63,000 tons from inventories at paper and board mills, mostly from purchased imported wood pulp. Paper and board mill inventories of wood pulp were 458,601 tons at the end of May, the highest May figure since 1943.

Lead Production At Low Ebb

Prolonged disagreement between labor and management continued to curtail the domestic mine production of lead in May. Smelters, refineries, and mines of the American Smelting & Refining Co., strike-bound since early in the year, remained inoperative during May. Utah operations of the United States Smelting, Refining & Mining Co. also remained closed. Many lead-producing mines dependent upon prompt payments for smelter shipments to cover basic operating expenses or with limited storage facilities for mine or mill production were unable to continue operating due to the smelter strikes.

The national railroad and coal mine strikes in May also, although indirectly, impeded lead output. The May production of 25,022 short tons of recoverable lead was 23 percent under the monthly average during 1945, and, except for the period 1932 to 1934 inclusive, was lower than the average monthly production of any year since the Bureau of Mines began compiling mine production statistics in 1907. The average daily output, which has been declining steadily since February 1946, slumped sharply in May to 807 tons, a new low for the year.

In the Western States except for Colorado, Montana, and Nevada, all States recorded declines in the rate of lead output. Production in the Central States decreased 1,832 tons (12 percent) in May; the average daily rate of output dropped to 18 percent under the rate of January 1946.

PAINT, VARNISH, LACQUER, AND FILLER

The statistics presented in this release show the value of sales by 680 manufacturing establishments. These establishments accounted for approximately 90 per cent of the total value of the output of the industry as reported in the Census of Manufacturers for 1939. Comparable statistics for the 680 manufacturing establishments are available by months beginning with January 1936.

Item	*1946*		*1945*
	April	*March*[1]	*April*
Total sales reported by 680 establishments	$72,381,752	$64,696,964	$58,391,532
Classified sales reported by 580 establishments:			
Trade sales of paint, varnish and lacquer	$40,805,364	$37,339,412	$26,438,966
Industrial sales, total	$24,258,825	$20,939,831	$25,953,181
Paint and varnish	18,180,108	15,726,045	19,679,706
Lacquer	6,078,717	5,213,786	6,273,475
Unclassified sales reported by 100 establishments	$7,317,563	$6,417,721	$5,999,385

[1] Revised.

SUPERPHOSPHATES

Production, Receipts, Disposition and Stocks
In short tons (2000 pounds)

Item May 1946	*Normal 18% APA*	*Concentrated 45% APA*	*Wet-base goods 18% APA*
Stocks on Hand, beginning of month	429,916	36,940	1,733
Production	616,680	26,423	5,231
Received from other acidulators inc. exchange transfers)	3,545	....	....
Book adjustments (account of inventory)	+3,203	+1,373	+66
Total supply	1,053,344	64,736	7,030
Disposition, total	646,725	22,271	4,823
Shipments, total	332,894	22,065	2,983
Used in reporting plants	313,831	206	1,840
Stocks on hand, end of month	406,619	42,465	2,207

SYNTHETIC ORGANIC CHEMICALS

Estimate of United States production and sales of intermediates and finished products in 1945 compared with the average of 1939-43 and the year 1944

(Quantity of production and sales in thousands of pounds; sales value in thousands of dollars)

Chemical	*Average 1939-43*	*1944*	*Increase or decrease (−), 1944 over 1939-43*	*Estimate for 1945*[1]	*Estimated increase or decrease (−), 1945 over 1944*
			Percent		*Percent*
Synthetic Organic Chemicals, Total					
Production, grand total	7,523,746	14,929,550	98.4	14,583,842	−2.3
Sales, grand total	4,234,962	10,061,193	137.6	9,448,119	−6.1
Sales value, grand total	801,930	2,004,621	150.0	1,953,260	−2.6
I. *Organic Chemicals, Cyclic*					
Production, total	1,868,593	4,805,870	157.2	5,000,789	4.1
Sales, total	1,231,919	3,938,432	219.7	3,685,747	−6.4
Sales value, total	367,008	881,299	140.1	923,825	4.8
A. *Intermediates*					
Production	1,066,103	2,143,305	101.0	2,192,601	2.3
Sales	549,729	1,555,749	183.0	1,238,376	[2]−20.4
Sales value	75,542	184,660	144.4	138,126	[2]−25.2
B. *Finished Products*					
Production, total	802,490	2,662,565	231.8	2,808,188	5.5
Sales, total	682,190	2,382,683	249.3	2,447,371	2.7
Sales value, total	291,466	696,639	139.0	785,699	12.8
1. *Dyes*					
Production, total	142,515	151,653	6.4	145,284	−4.2
Sales, total	140,864	150,049	6.5	137,895	−8.1
Sales value, total	92,952	110,748	19.1	102,885	−7.1
2. *Lakes and Toners*					
Production	19,427	19,197	−1.2	24,630	28.3
Sales	17,376	18,401	5.9	23,221	26.2
Sales value	12,826	13,793	7.5	18,619	35.0
3. *Medicinals*					
Production	30,927	35,353	14.3	36,025	1.9
Sales	27,353	33,103	21.0	31,349	−5.3
Sales value	56,445	94,039	66.6	147,829	[3]57.2
4. *Flavor and Perfume Materials*					
Production	8,687	11,726	35.0	14,575	24.3
Sales	8,082	11,050	36.7	12,520	13.3
Sales value	9,656	14,565	50.8	15,439	6.0
5. *Plastics Materials*					
Production	284,530	404,113	42.0	385,524	−4.6
Sales	226,001	380,822	68.5	349,214	−8.3
Sales value	55,553	83,264	49.9	88,010	5.7
6. *Rubber-processing Chemicals*					
Production	41,656	73,774	77.1	82,332	11.6
Sales	34,284	66,260	93.3	70,302	6.1
Sales value	15,229	27,446	80.2	29,120	6.1
7. *Elastomers (Synthetic Rubbers)*					
Production	82,782	1,500,993	1713.2	1,619,571	7.9
Sales	80,211	1,395,136	1639.3	1,499,771	7.5
Sales value	14,871	268,315	1704.3	286,829	6.9
8. *Plasticisers*					
Production	60,811	160,235	163.5	150,621	−6.0
Sales	56,076	153,120	173.1	131,224	−14.3
Sales value	12,859	32,257	150.9	27,547	−14.6
9. *Surface-Active Agents*[4]					
Production	18,115	74,264	310.0	90,156	21.4
Sales	13,105	70,880	440.9	61,736	−12.9
Sales value	2,533	11,905	370.0	17,465	46.7
10. *Miscellaneous*[5]					
Production	113,040	231,257	104.6	259,470	12.2
Sales	78,838	103,862	31.7	130,139	25.3
Sales value	18,542	40,307	117.4	51,956	28.9

(Continued on page 383)

II. *Organic Chemicals, Acyclic (Intermediates and Finished Products)*					
Production, total	5,655,153	10,123,680	79.0	9,583,053	-5.3
Sales, total	3,003,043	6,122,761	103.9	5,762,372	-5.9
Sales value, total	434,922	1,123,322	158.3	1,029,435	-8.4
1. *Medicinals*					
Production	2,751	3,398	23.5	4,927	45.0
Sales	2,390	3,109	30.1	4,620	48.6
Sales value	8,964	17,756	98.1	16,300	-8.2
2. *Flavor and Perfume Materials*					
Production	3,054	4,553	49.1	5,072	11.4
Sales	2,949	4,514	53.1	4,997	10.7
Sales value	2,902	4,546	56.7	5,382	18.4
3. *Plastics Materials*					
Production	122,660	378,239	208.4	394,125	4.2
Sales	107,989	316,506	193.1	390,252	23.3
Sales value	53,967	128,078	137.3	199,161	55.5
4. *Rubber-processing Chemicals*					
Production	16,240	18,865	16.2	23,845	26.4
Sales	15,319	18,465	20.5	24,097	30.5
Sales value	4,486	14,629	226.1	16,721	14.3
5. *Elastomers (Synthetic Rubbers)*					
Production	51,340	256,917	400.4	410,553	59.8
Sales	45,926	233,301	408.0	431,840	85.1
Sales value	25,626	85,435	233.4	102,522	20.0
6. *Plasticizers*					
Production	12,630	26,510	109.9	23,461	-11.5
Sales	10,036	18,621	85.5	20,353	9.3
Sales value	3,424	6,808	98.8	7,523	10.5
7. *Surface-Active Agents*[4]					
Production	58,400	78,372	34.2	84,720	8.1
Sales	54,200	63,826	17.8	72,060	12.9
Sales value	14,634	18,033	23.2	23,749	31.7
8. *Miscellaneous*[5]					
Production	5,388,078	9,356,826	73.7	8,636,350	-7.7
Sales	2,764,234	5,464,419	97.7	4,814,153	-11.9
Sales value	320,919	848,037	164.3	658,077	-22.4

[1] Estimated from the production and sales by groups of about 450 companies in 1944 as compared with the production and sales by groups of the same companies as reported in 1945.
[2] The large decrease in sales relative to production is partly due to increased consumption of ethylbenzene in producing plants in 1945 as compared with 1944 when considerable quantities of this material were reported as sold.
[3] The relatively large increase in the value of sales is attributable largely to the fact that penicillin is included in the 1945 figures but not in those for 1944. The inclusion of this drug greatly increased the value figures but affected the quantity figures only slightly.
[4] Data for average 1939-43 are partly estimated.
[5] Statistics of production and sales of plasticizers and surface-active agents are not included with the totals for miscellaneous chemicals as was done in earlier reports.

(*Source: U. S. Tariff Commission*)

PLASTIC WATERPAINTS, COLD-WATER PAINTS AND CALCIMINES

April, 1945
Compared with Preceding Months

More plastic-texture water paint, and lime and cement bound exterior cold-water paints, were sold in April 1946 than in any other month on record since the Census began the monthly Plastic Water Paints, Cold-Water Paints, and Calcimines survey in 1930. Sales of lime and cement bound exterior cold-water paints were almost double the sales of last April and plastic-texture water paint sales showed an even greater increase over April 1945.

Sales of all types of interior cold-water paints showed an increase in April 1946 over last April; the greatest gain, that for the dry powder form, amounted to 38 percent. The amount of calcimines sold in April 1946 was also greater than last April with the increase in the sales of hot-water calcimines more than offsetting the decrease shown in the sales of cold-water calcimines. In comparison with March 1946, April sales of interior cold-water paints and cold-water calcimines shown a general decline with the greatest decrease, that for glue bound interior cold-water paints, amounting to 25 percent.

The statistics presented in the following table are based on data reported by 38 identical manufactures who accounted for approximately 87 percent of the total value of plastic-texture paints, cold-water paints and calcimines in the United States, as reported in the Biennial Census of Manufacturers, 1939. For comparable figures beginning January 1945, and an explanation of certain changes which affect previously published data, see "Facts for Industry," Series M19K-85, released November 12, 1945.

Sales for April and March

	Production		
	April 1946	*March 1946*	*April 1945*
Plastic-texture Water Paints, Total:[1]			
Pounds	1,730,778	1,235,175	667,017
Value	$113,285	$84,540	$46,170
Cold-Water Paints, Total Value	$635,607	$579,752	$466,256
Interior, total value	$351,333	$364,835	$303,959
Casein and other protein bound:			
Paste and semipaste form—			
Gallons	207,380	212,599	183,078
Value	$270,770	$274,365	$237,251
Dry Powder form—			
Pounds	796,117	952,543	577,322
Value	$67,709	$75,294	$57,769
Glue bound—			
Pounds	272,241	364,049	222,545
Value	$12,854	$15,176	$8,939
Exterior, total value	$284,274	$214,917	$162,297
Casein and other protein bound:			
Pounds	401,083	308,391	402,858
Value	$24,505	$17,080	$30,778
Lime and/or cement bound—			
Pounds	3,340,093	2,542,256	1,731,598
Value	$259,769	$197,837	$131,519
Calcimines, Total:			
Pounds	2,316,755	2,119,296	2,001,698
Value	$99,596	$98,052	$95,204
Hot-water—			
Pounds	1,406,438	1,107,253	993,657
Value	$59,924	$52,433	$44,884
Cold-water—			
Pounds	910,317	1,012,043	1,008,041
Value	$39,672	$45,619	$50,320

[1] Includes Paste and Dry Powder Plastic-Texture Water Paints which cannot be shown separately without disclosing operations of individual companies.

(*Source: Bureau of the Census*)

Fertilizer Consumption At Peak

Fertilizer consumption in the United States rose to a new all-time peak in 1945 when it reached 13,202,000 tons, according to the annual compilation of The National Fertilizer Association. This marked the seventh consecutive year in which an increase occurred. The total consumption in 1945 was 1,147,000 tons, or 9.5 percent, greater than in 1944. The increase in 1945 over the five-year average preceding the war, 1935-1939, was 5,864,000 tons, or 80 percent.

This production record was achieved in the face of a world-wide conflict when most foreign raw materials supplies were cut off. The fertilizer industry, profiting from the experience of World War I, was better able to anticipate the difficulties which arose in World War II and to make this record production possible.

Magnesite Production Dips

Mine production of crude magnesite in 1945 was 336,458 short tons, according to the Bureau of Mines, United States Department of the Interior, the lowest since 1940, but still high compared with prewar figures—the 3-year average of 1937-1939, for example, being 166,000 short tons. The main reason for the decline was the closing of the giant Basic Magnesium Inc. flotation plant at Gabbs, Nev., which had provided raw material for much-needed magnesium metal during 1943-1944.

The main use of magnesite is in refractories. Magnesia grain, cement and brick are used in the construction and maintenance of basic open-hearth steel furnaces. Caustic-calcined magnesia (roasted in a rotary kiln at lower temperatures than refractory magnesia) is used in oxychloride-cement flooring, fertilizers and rubber manufacture.

Production and sales data for the domestic magnesite and magnesia industries are given in the following table:

	Crude magnesite mined[1]	
Year	*Short tons*	*Value*
1941	374,799	$2,655,547
1942	497,368	3,874,334
1943	754,832	6,071,596
1944	561,450	4,407,461
1945	336,458	2,324,957

[1] Partly estimated; most of the crude is processed by the mining companies, and very little enters open market.

Calcium Chloride Sales Gain

Production of natural calcium chloride and calcium-magnesium chloride from natural brines in 1945 was 218,320 short tons, a substantial gain over 1944. The increase is attributed to greater demand in the stabilization of rural roads and in concrete mixes.

Year	*Short tons*	*Value*
1941	165,932	$1,333,370
1942	224,527	1,733,169
1943	199,796	1,549,565
1944	200,964	1,621,227
1945	218,320	1,818,219

CHEMICALS

United States Production, May 1946

Statistics on the production of chemicals shown in the following table are a continuation of the series initiated on February 7, 1944, in "Facts for Industry," Series 6-1-1. With the end of the war, the list of chemicals covered was reviewed and those presented here were selected for continuation. While considerably curtailed, this group of chemicals and gases is fairly representative of the products of the inorganic chemicals industry, and provides sufficient information for gaging the broad changes in operations from month to month. This list is subject to change if future developments indicate that additional chemicals should be covered or that certain of those on which data are now published have relatively small interest. The figures shown here represent the primary production of the various chemicals in the United States, including quantities produced for consumption in the producing plant, produced for intra-company transfer and produced for sale. Data on consumption and stocks in producing plants, included in this release through September 1945, are no longer collected.

Chemical and Basis	*Unit*	*Production* — *May (Preliminary)*	*Production* — *April (Revised)*
Ammonia, synthetic anhydrous[1]	Short tons	34,511	43,358
Ammonium nitrate (100% NH_4NO_3)	Short tons	35,597	42,680
Ammonium sulfate, synthetic (technical)[2]	M pounds	17,054	*18,102
Calcium arsenate (100% $Ca_3(AsO_4)2$)	M pounds	3,496	3,256
Calcium carbide (commercial)	Short tons	36,761	40,014
Calcium phosphate:			
Monobasic (100% $CaH_4(PO_4)2$)	M pounds	4,867	5,158
Dibasic (100% $CaHPO_4$)	M pounds	4,143	6,863
Carbon dioxide:			
Liquid and gas	M pounds	16,979	*17,149
Solid (dry ice)	M pounds	58,197	58,185
Chlorine	Short tons	89,960	94,865
Chrome green (C.P.)	M pounds	1,592	1,649
Chrome yellow and orange (C.P.)	M pounds	3,376	4,129
Copper acetoarsenite (Paris green)	M pounds	(3)	(3)
Hydrochloric acid (100% HCl)	Short tons	26,331	*26,867
Hydrofluoric acid:			
Anhydrous (100% H_2F_2)	M pounds	3,443	3,822
Technical (100% H_2F_2)	M pounds		
Hydrogen	Millions of cubic feet	1,203	1,385
Lead arsenate (acid and basic)	M pounds	[4]7,956	8,665
Methanol (natural) (100% CH_3OH)	M gallons	208	185
Molybdate chrome orange (C.P.)	M pounds	386	469
Nitric acid (100% HNO_3)	Short tons	32,538	31,311
Oxygen	M cu. ft.	834,997	864,868
Phosphoric acid:			
Total (50% H_3PO_4)[5]	Short tons	62,674	*70,740
From phosphorus (50% H_3PO_4)[6]	Short tons	32,706	38,598
From phosphate rock (50% H_3PO_4)[6]	Short tons	29,968	*32,142
Silica gel:			
Desiccant grade	M pounds	3,016	4,163
Aviation gas catalyst grade	M pounds		
Silver nitrate (100% $AgNO_3$)	M ounces	3,712	2,446
Soda ash (commercial sodium carbonate):			
Ammonia soda process—			
Total wet and dry (98-100% Na_2CO_3)[7]	Short tons	303,174	342,749
Finished light (98-100% Na_2CO_3)[8]	Short tons	150,969	172,630
Finished dense (98-100% Na_2CO_3)	Short tons	104,055	117,344
Natural (Na_2CO_3 equivalent)[9]	Short tons	17,847	*15,144
Sodium bicarbonate (refined) (100% $NaHCO_3$)	Short tons	14,399	17,444
Sodium bichromate and chromate	Short tons	7,096	7,837
Sodium hydroxide (caustic soda):[10]			
Electrolytic process—			
Liquid (100% NaOH)	Short tons	87,240	92,396
Solid (100% NaOH)	Short tons	15,630	15,844
Lime-soda process—			
Liquid (100% NaOH)	Short tons	52,050	58,936
Solid (100% NaOH)	Short tons	14,740	17,813
Sodium phosphate:			
Monobasic (100% NaH_2PO_4)	Short tons	504	1,054
Dibasic (100% Na_2HPO_4)	Short tons	2,876	5,961
Tribasic (100% Na_3PO_4)	Short tons	6,087	8,638
Meta (100% $NaPO_3$)	Short tons	1,349	2,294
Tetra (100% $Na_4P_2O_7$)	Short tons	4,457	4,935
Sodium silicate:			
Soluble silicate glass, liquid and solid (anhydrous)	Short tons	29,198	29,914
Sodium sulfate:			
Anhydrous (refined) (100% Na_2SO_4)[9]	Short tons	27,098	*26,395
Glauber's salt (100% $Na_2SO_4.10H_2O$)[9]	Short tons	14,592	13,465
Salt cake (crude) (commercial)	Short tons	30,558	*30,650
Sulfuric acid:			
Total (100% H_2SO_4)[11]	Short tons	780,702	804,285
Chamber process (100% H_2SO_4)	Short tons	[12]267,845	[13]282,452
Contact Process (100% H_2SO_4)	Short tons	[14]512,857	[14]521,833
Net, contact process (100% H_2SO_4)[12 15]	Short tons	[14]472,693	[14]472,857
Zinc yellow (zinc chromate) (C.P.)	Short tons	(3)	(3)

* Revised.

[1] Data for a small amount of aqua ammonia are included in the figures reported by one company.

[2] Excluded by-product coke oven production of ammonium sulfate which is published monthly by the Bureau of Mines.

[3] Data cannot be published without disclosing operations of individual establishments.

[4] Proportion of estimates, 3.8 per cent.

[5] Production figures for January, 33,907 tons; February, 37,650 tons; and March, 40,412 tons.

[6] Production figures for January, 34,545 tons; February 31,875 tons; and March, 34,188 tons.

[7] Includes quantities diverted to manufacture of caustic soda and sodium bicarbonate and quantities processed to finished light and finished dense soda ash. For detailed discussion of soda ash statistics, see "Facts for Industry," Series 6-1-1.

[8] Not including quantities converted to finished dense soda ash.

[9] Collected in cooperation with Bureau of Mines.

[10] Production figures represent total production of liquid material, including quantities evaporated to solid caustic and reported as such.

[11] Includes sulfuric acid of oleum grade. Beginning January 1946, includes estimates of by-product operations of eight smelters formerly reporting to the Bureau of Mines. See footnotes 12 and 14.

[12] Proportion of estimate, 7 per cent.

[13] Includes sulfuric acid of oleum grade.

[14] Proportion of estimate, 2.5 per cent or less.

[15] Excludes spent acid. For detailed explanation see "Facts for Industry," Series 6-1-1.

(*Source: Bureau of the Census*)

New Carbon Black Peak

Both production and sales of carbon black exceeded one billion pounds for the first time in 1945, according to the Bureau of Mines, U. S. Department of the Interior.

Production increased 31 percent over 1944 to 1,052,798,000 pounds, aided by completion of several new plants. The rate of output, however, was below demand until early summer, when smaller demand for military tires eased the situation. In the late months of 1945 production overtook the rate of sales and producers' stocks increased to 102,005,000 pounds on December 31, compared with 69,243,000 pounds at the end of 1944.

The production of contact process blacks that had declined from 1940 through 1943, gained 30 percent over 1944 to a new record of 538,539,000 pounds. Furnace black output continued its upward trend, increasing 33 percent to 514,259,000 pounds in 1945, or 49 percent of total production, compared with 48 percent in 1944. Texas output of all grades gained 44 percent over 1944 and equaled 69 percent of the U. S. total.

Gas consumed in carbon black manufacture increased 21 percent over 1944 to a new record of 431,830 million cubic feet. The average yield of carbon black was 2.32 pounds per thousand cubic feet of gas in 1945 and 2.20 pounds in 1944. The average value of natural gas used increased to 2.28 cents per thousand cubic feet from 1.62 cents in 1944 and was more than double the average (1.13 cents) of 1941.

Sales to rubber companies increased from 738,029,000 pounds in 1944 to 804,386,000 pounds in 1945 and exports increased 11 percent to 173,773,000 pounds as shipments to Europe expanded after the war. Larger sales to paint manufacturers were offset by smaller takings by the ink and miscellaneous trades.

The average value of carbon black at the plants rose to 4.02 cents a pound in 1945, the highest average since 1929.

There were 58 plants operated in 1945, compared with 54 in 1944.

GELATIN

PRODUCTION, SHIPMENTS AND STOCKS

(Pounds)

Item	*1946* — *May*	*1946* — *April*
Production		
Gelatin, total	3,825,282	3,783,622
Edible	2,271,425	2,318,396
Technical	212,975	217,802
Pharmaceutical	368,329	456,452
Photographic	972,553	790,972
Shipments		
Gelatin, total	3,637,576	3,823,679
Edible	2,299,527	2,391,734
Technical	198,146	211,189
Pharmaceutical	340,672	364,429
Photographic	799,231	856,327
Stocks (End of Month)		
Gelatin, total	6,320,894	*6,125,511
Edible	2,695,153	*2,715,579
Technical	136,043	*121,214
Pharmaceutical	426,711	399,054
Photographic	3,062,987	*2,889,664

* Revised.

CURRENT PRICES

Chemical prices quoted are of American manufacturers for spot New York, immediate shipment, unless otherwise specified. Products sold f.o.b. works are specified as such. Import chemicals are so designated.

Oils are quoted spot New York, ex-dock. Quotations f.o.b. mills, or for spot goods at the Pacific Coast are so designated.

Raw materials are quoted New York, f.o.b., or ex-dock. Materials sold f.o.b. works or delivered are so designated.

The current range is not "bid and asked," but are prices from different sellers, based on varying grades or quantities or both.

Purchasing Power of the Dollar: 1926 Average—$1.00
July, 1944, $0.890 *July, 1945, $0.864*
July, 1946, $0.767

	Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Acetaldehyde,99%,drs.wks. lb.	.11	.14	.11	.14	.11	.14
Acetic Anhydride, drs, . . lb.	.11½	.13	.11½	.13	.11½	.13
Acetone, tks, delv. . . . . lb.	.06	.07	.06	.07	.06	.07
ACIDS						
Acetic, 28%, bbls . . . . 100 lbs.	3.38	3.63	3.38	3.63	3.38	3.63
glacial, bbls. . . . . 100 lbs.	9.15	9.40	9.15	9.40	9.15	9.40
tks, wks. . . . . 100 lbs.	6.93	7.25	6.93	7.25	6.93	7.25
Acetylsalicylic, Standard USP . . . . . lb.	.40	.54	.40	.54	.40	.54
Benzoic, tech. bbls. . . . . lb.	.43	.47	.43	.47	.43	.47
USP, bbls, 4,000 lbs. up lb.	. . .	.54	. . .	.54	. . .	.54
Boric tech, bbls. c-l. . tons *a*	. . .	109.00	. . .	109.00	. . .	109.00
Chlorosulfonic, drs, wks. . lb.	.03	.04½	.03	.04½	.03	.04½
Citric, USP, crys, gran, bbls. . . . . lb. *b*	.20	.21	.20	.21	.20	.21
Cresylic 50%, 210-215° HB, drs. wks. frt. equal gal.	.81	.96	.81	.96	.81	.83
Formic, 85%-90% cbys. . . lb.	.10	.11½	.10	.11½	.10	.11½
Hydrofluoric, 30% rubber, dms. . . . . lbs.	.08	.09	.08	.09	.08	.09
Lactic, 22%, lgt, bbls wks lb.	.039	.0415	.039	.0415	.039	.0415
44%, light, bbls wks . . . lb.	.073	.0755	.073	.0755	.073	.0755
Maleic, Anhydride, drs . . . lb.	.25	.26	.25	.26	.25	.26
Muriatic 18° cbys . . . . 100 lb.	1.50	2.45	1.50	2.45	1.50	2.45
20° cbys, c-l, wks. . . 100 lb.	. . .	1.75	. . .	1.75	. . .	1.75
22° cbys, c-l, wks. . . 100 lb.	. . .	2.25	. . .	2.25	. . .	2.25
Nitric,36°,cbys, wks 100 lbs. *c*	5.00	5.25	5.00	5.25	5.00	5.25
38°, c-l, cbys, wks 100 lbs. *c*	. . .	5.50	. . .	5.50	. . .	5.50
40°, c-l, cbys, wks 100 lbs. *c*	. . .	6.00	. . .	6.00	. . .	6.00
42°, c-l, cbys, wks 100 lbs. *c*	. . .	6.50	. . .	6.50	. . .	6.50
Oxalic, bbls, wks . . . . . lb.	.11¼	.12½	.11¼	.12½	.11¼	.12½
Phosphoric, 100 lb. cbys, USP . . . . . lb.	.10½	.13	.10½	.13	.10½	.13
Salicylic tech, bbls . . . . . lb.	.26	.42	.26	.42	.26	.42
Sulfuric, 60°, tks, wks . . ton	. . .	13.00	. . .	13.00	. . .	13.00
66°, tks, wks . . . . . ton	. . .	16.50	. . .	16.50	. . .	16.50
Fuming 20% tks, wks ton	. . .	19.50	. . .	19.50	. . .	19.50
Tartaric, USP, bbls . . . . . lb.	.62½	.63	.62½	.71	.70½	.71
Alcohol, Amyl (from Pentane) tks, delv . . . . . lb.	. . .	.131	. . .	.131	. . .	.131
Butyl, normal, syn, tks lb.	. . .	.10¾	. . .	.10¾	. . .	.10¾
Denatured, CD 14, c-l drs . . . . . gal. *d*	. . .	.613	. . .	.613	. . .	.59
Denatured, SD, No. 1, tks.*d*	. . .	.542	. . .	.542	. . .	.52
Ethyl, 190 proof tks . . . gal.	. . .	17.65½	. . .	17.65½	. . .	17.60
Isobutyl, ref'd, drs . . . . lb.	. . .	.0660	. . .	.0660	. . .	.086
Isopropyl ref'd, 91%, dms . . . . . gal.	.38	.41	.38	.41	.37½	.66½
Alum, ammonia, lump, bbls, wks . . . . . 100 lb.	. . .	4.25	. . .	4.25	. . .	4.25
Aluminum, 98-99% . . . 100 lb.	15.00	16.00	15.00	16.00	15.00	16.00
Chloride anhyd l.c.l. wks lb.	.09	.12	.09	.12	.08	.12
Hydrate, light, bgs. . . . lb.	. . .	.14½	. . .	.14½	.14½	.15
Sulfate, com'l. bgs, wks, c-l . . . . . 100 lb.	1.15	1.20	1.15	1.25	1.15	1.25
Sulfate, iron-free, bgs, wks . . 100 lb.	1.75	2.00	1.75	2.00	1.75	2.10
Ammonia anhyd, cyl . . . . . lb.	. . .	.14½	. . .	.14½	. . .	.14½
Ammonia, anhyd. fert. tank cars, wks. frt. equalized ton	. . .	59.00	. . .	59.00	. . .	59.00
Ammonium Carbonate, USP, lumps, dms . . lb.	.08¾	.09½	.08¾	.09½	.08¾	.09¼
Chloride,whi,bbls,wks,100 lb.	4.45	5.15	4.45	5.15	4.45	5.15
Nitrate, tech. bags, wks. lb.	.0435	.0450	.0435	.0850	.0435	.0850
Oxalate pure, grn. bbls. lb.	. . .	.23	. . .	.23	.27	.33
Perchlorate, kgs . . lb.	no stocks		no stocks		no stocks	
Phosphate, dibasic tech. bgs . . . . lb.	.07	.07¾	.07	.07¾	.07	.08½
Stearate, anhyd. dms. . . lb.	. . .	.34	. . .	.34	. . .	.34
Sulfate, dms, bulk . . ton	28.20	29.20	28.20	29.20	28.20	29.20
Amyl Acetate (from pentane) tks., delv. . . . . lb.	. . .	.14½	. . .	.14½	. . .	.15½
Aniline, Oil, drs . . . . lb.	.12	.13	.11½	.13	.11½	.12½
Anthraquinone, sub, bbls. . lb.	. . .	.70	. . .	.70	. . .	.70
Antimony Oxide, bgs . . . lb.	.17	.17½	.15	.17½	.15	.16
Arsenic, whi, kgs—powd. lb.	.04	.04¾	.04	.04¾	.04	.04¾

USP $25 higher; Prices are f.o.b. N. Y., Chicago, St. Louis, deliveries ½c higher than NYC prices; *y* Price given is per gal; *c* Yellow grades 25c per 100 lbs less in each case; *d* Prices given are Eastern schedule, *a* Powdered boric acid $5 a ton higher; *b* Powdered citric acid is ½c higher

		Current		1946		1945	
		Low	High	Low	High	Low	High
Barium Carbonate precip, wks, bgs.	ton	60.00	75.00	60.00	75.00	60.00	75.00
Chloride, tech, cyst, bgs, zone 1	ton	73.00	78.00	73.00	78.00	73.00	78.00
Barytes, floated, bbls.	ton	...	36.00	...	36.00	...	36.00
Bauxite, bulk mines	ton	7.00	10.00	7.00	10.00	7.00	10.00
Benzaldehyde,tech,cbys,dms	lb.	.45	.55	.45	.55	.45	.55
Benzene (Benzol), 90%, tks, ft all'd	gal.		.15	...	.15	...	.15
Benzyl Chloride, cbys	lb.	.20	.21	.20	.24	.22	.24
Beta-Naphthol, tech, bbls, wks	lb.	.21	.23	.21	.24	.23	.24
Bismuth metal, ton lots	lb.	...	1.25	...	1.25	...	1.25
Blanc Fixe, 66⅔% Pulp, bbls, wks	ton A	40.00	46.50	40.00	46.50	40.00	46.50
Bleaching Powder, wks,100 lb.		2.50	3.10	2.50	3.60	2.50	3.60
Borax, tech, c-l, bgs	ton i	...	45.00	...	45.00	...	45.00
Bordeaux Mixture, drs	lb.	.11	.11½	.11	.11½	.11	.11½
Bromine, cases	lb.	.21	.23	.21	.23	.21	.30
Butyl, acetate, norm. drs	lb.	.2035	.2085	.1860	.2155	17.90	19.45
Cadmium Metal	lb.	.90	.95	.90	.95	.90	.95
Calcium. Acetate, bgs, 100 lb.		3.00	4.00	3.00	4.00	3.00	4.00
Carbide, drs	ton	50.00	90.00	50.00	90.00	50.00	95.00
Carbonate, c-l bgs	ton	18.00	22.00	18.00	22.00	18.00	22.00
Chloride, flake, bgs c-l	ton	18.50	35.00	18.50	35.00	18.50	35.00
Solid, 73-75% drs, c-l,	ton	18.00	34.50	18.00	34.50	18.00	34.00
Cy'n'd, min. 21% N, c.l.	lb.	.02¼	.02¾	...	...	...	...
Gluconate, U.S.P., drs.	lb.	.57	.59	.57	.59	.57	.59
Phosphate, tri, bbls, cl.	lb.	...	.0635	...	.0635	...	.0635
Camphor, U.S.P., gran, powd, bbls	lb.	.69	.71	.69	.71	.69	.71
Carbon Bisulfide, 55-gal drs	lb.	.05	.05¾	.05	.05¾	.05	.05¾
Dioxide, cyl	lb.	.06	.08	.06	.08	.06	.08
Tetrachloride, Zone 1, 52½ gal. drms	gal.	.69	.76	.69	.80	.73	.80
Casein, Acid Precip, bgs, 100 or more	lb.	...	.33	.24	.33	...	.24
Chlorine, cyls, lcl, wks, contract	lb.	...	.07¼	...	.07¼	...	.07¼
cyls, c-l, contract	lb.	...	.05¼	...	.05¼	...	.05¼
Liq. tk, wks, contract 100	lb.	...	1.75	...	1.75	...	1.75
Chloroform, tech, drs	lb.	.20	.23	.20	.23	.20	.23
Coal tar, bbls, crude	bbl.	8.25	8.75	8.25	8.75	8.25	8.75
Cobalt, Acetate, bbl	lb.	...	.83¾	...	.83¾	...	.83¾
Oxide, black kgs	lb.	...	1.84	...	1.84	...	1.84
Copper, metal 100	lb.	...	14.37	12.00	14.37	12.00	12.50
Carbonate, 52-54%, bbls.	lb.	.19½	.20½	.19½	.20½	.19½	.20½
Sulfate, bgs, wks cryst. 100	lb.	5.00	5.65	5.00	5.65	5.00	5.50
Copperas, bulk, c-l, wks	ton	...	14.00	...	14.00	...	14.00
Cresol, USP, drs	lb.	.10¾	.11¾	.10¾	.11¾	.10¾	.11¾
Dibutylamine, c-l, drs wks.	lb.	...	.66	...	.66	...	.66
Dibutylphthalate, drs	lb.	.2000	.2359	.1700	.2359	.1770	.2359
Diethylaniline, drs.	lb.		.40		.40		.40
Diethyleneglycol, drs, wks	lb.	.14	.15	.14	.15	.14	.15½
Dimethylaniline, dms,cl.,lcl	lb.	.21	.22	.21	.22	.23	.24
Dimethyl phthalate, drs	lb.	.20	.20½	.20	.20½	.20	.20½
Dinitrobenzene, bbls	lb.	...	.18	...	.18	...	.18
Dinitrochlorobenzene, dms.	lb.	...	.14	...	.14	...	.14
Dinitrophenol, bbls	lb.	...	.22	...	.22	...	.22
Dinitrotoluene, dms	lb.	...	.18	...	.18	...	.18
Diphenyl, bbls lcl. wks.	lb.	.16	.20	.16	.20	.16	.20
Diphenylamine bbls	lb.	...	.25	...	.25	...	.25
Diphenylguanidine, drs	lb.	.35	.37	.35	.37	.35	.37
Ethyl Acetate, tks, frt all'd	lb.	...	.1175	.0950	.1175	.0975	.1175
Chloride, drs	lb.	.18	.20	.18	.20	.18	.20
Ethylene Dichloride, lcl. wks, E. Rockies, dms	lb.	.0891	.0941	.0842	.0941	.0842	.0941
Glycol, dms, cl.	lb.	...	.10	...	.10	...	.10
Fluorspar, No. 1, grd.95-98% bulk, cl-mines	ton	...	37.00	...	37.00	...	37.00
Formaldehyde, bbls, cl & lcl	lb.	.0520	.0570	.0520	.0570	.0520	.0570
Furfural tech, dms, c-l,wks	lb.	...	.13	...	.13	...	.13
Fusel Oil, ref'd, dms, dlvd	lb.	.18½	.19½	.18½	.19½	.18½	.19½
Glauber's Salt, Cryst, c-l, bgs, bbls, wks	100 lb.	1.05	1.45	1.05	1.45	1.05	1.45
Glycerine dynamite, dms, c-l,	lb.	.17½	.18¼	.17½	.18¼	...	.16½
Crude Saponification, 80% to refiners tks	lbs.	...	.11½	...	.11½	.09½	.11½

GUMS

Gum Arabic, amber sorts bgs	lb.	.14¼	.14¾	.11¾	.14¾	.11	.13
Benzoin, artificial, cns.	lb.	1.75	2.55	.52	1.00	.52	1.00
Copal, Congo	lb.	...	no stocks	...	.55¾	...	.55¾
Copal, East India, chips	lb.	...	no stocks	...	.55¾	...	.55¾
Macassar dust	lb	...	no stocks	...	.07⅜	...	.07⅜
Copal Manila,		...	no stocks	.13½	.15½	.13½	.15½
Copal Pontianak, bold c-l	lb.	...	no stocks	...	.17⅜	...	.23⅜
Karaya, bbls, bxs, dms.	lb.	.21	.50	.18	.50	.15	.46

ABBREVIATIONS—Anhydrous, anhyd; bags, bgs; barrels, bbls; carboys, cbys; carlots, c-l; less-than-carlots, lcl; drums, drs; kegs, kgs; powdered, powd; refined, ref'd; tanks, tks; works, f.o.b., wks.

Current Prices

		Current Low	Current High	1946 Low	1946 High	1945 Low	1945 High
Kauri, N. Y.							
Superior Pale XXX	lb.	...	nom.	...	.65¾	...	.65¾
No. 3	lb.	...	nom.	...	.22	...	.22
Sandarac, cs	lb.		nom.	.97½	.99½		.99½
Tragacanth, No. 1, cases	lb.	5.00	5.25	3.75	5.25	3.80	5.00
No. 3	lb.	3.20	3.45	2.10	3.45	2.15	3.00
Yacca, bgs	lb.	...	nom.	.05	.07¼	.06	.07¼
Hydrogen Peroxide, cbys	lb.	.15½	.18½	.15½	.18½	.15½	.18½
Iodine, Resublimed, jars	lb.	1.75	1.85	1.75	1.85	1.75	2.10
Lead Acetate, cryst, bbls.	lb.	...	.12½	...	.12½	...	.12½
Arsenate basic, bg, lcl	lb.	.12	.12½	...	.12	.11½	.12
Nitrate, bbls.	lb.	...	.12½	...	.12½	...	.12½
Red, dry, 95% Pb_3O_4 bbls.	lb.	.12	.13¾	.09	.13¾	.09	.10¾
97% Pb_3O_4, bbls delv.	lb.	.11¼	.14½	.09½	.14¾	.09½	.11¾
98% Pb_3O_4, bbls delv.	lb.	.12½	.14¼	.08¼	.14¼	.08¼	.08¾
White, bbls	lb.	.11	.11½	.07¾	.11½	.07¼	.08
Basic sulfate, bbls, lcl	lb.	.09¾	.10¼	.07¼	.10¼	.07¼	.08
Lime, Chem., wks, bulk	ton	6.50	9.25	6.50	9.25	6.25	13.00
Hydrated, f.o.b. wks	ton	8.50	12.00	8.50	12.00	8.50	16.00
Litharge, coml, delv. bbls.	lb.	.13½	.15¼	.08	.15¼	.08	.09¾
Lithopone, ordi., bgs	lb.	.04¼	.04½	.04¼	.04¾	.04¼	.04¾
Magnesium Carb, tech, wks	lb.	.07¼	.10¾	.07¼	.10¾	.06¼	.10¾
Chloride flake, bbls, wks c-l	ton	...	32.00	...	32.00	...	32.00
Manganese, Chloride, Anhyd. bbls.	lb.	.14	.16	.14	.18	.15	.18
Dioxide, Caucasian bgs, lcl	ton	74.75	79.75	74.75	79.75	74.00	79.75
Methanol, pure, nat, drs gal	*l*	.63	.73	.63	.73	.63	.76
Synth, drs cl gal.	*m*	.31	.38	.24	.38	.31	.38
Methyl Acetate, tech tks.	lb.	.06	.07	.06	.07	.06	.07
C.P. 97-99%, tks, delv	lb.	.09½	.10½	.09½	.10½	.09½	.10½
Chloride, cyl	lb.	.32	.36	.32	.40	.32	.40
Ethyl Ketone, tks, frt all'd	lb.	...	.08	...	.08	...	.08
Naphtha, Solvent, tks	gal.	...	.27	...	.27	...	.27
Naphthalene, crude, 74°, wks tks	lb.	.0275	.0325	.0275	.0325	...	.0275
Nickel Salt, bbls, NY	lb.	.13	.13½	.13	.13½	.13	.13½
Nitre Cake, blk	ton	...	16.00	...	16.00	...	16.00
Nitrobenzene, drs, wks	lb.	.08	.09	.08	.09	.08	.09
Orthoanisidine, bbls	lb.	...	.70	...	.70	...	.70
Orthochlorophenol, drs	lb.	.25	.27	.25	.27	.25	.27
Orthodichlorobenzene, drms	lb.	.07	.08	.07	.08	.07	.08
Orthonitrochlorobenzene, wks	lb.	.15	.18	.15	.18	.15	.18
Orthonitrotoluene, wks, dms	lb.	...	.09	...	.09	...	.09
Paraldehyde, 98%, wks lcl	lb.	...	.12	...	.12	...	.12
Chlorophenol, drs	lb.	.24	.27	.24	.27	.25	.32
Dichlorobenzene, wks	lb.	.11	.15	.11	.15	.11	.15
Formaldehyde, drs, wks	lb.	.21	.22	.21	.22	.21	.22
Nitroaniline, wks, kgs	lb.	.41	.43	.41	.45	.43	.45
Nitrochlorobenzene, wks	lb.	...	.15	...	.15	...	.15
Toluenesulfonamide, bbls	lb.	...	.70	...	.70	...	.70
Toluidine, bbls, wks	lb.	...	.48	...	.48	...	.48
Penicillin, ampules per 100,00 units		...	.48	.48	.95	.59	2.40
Pentaerythritol, tech	lb.	.27	.31	.27	.31	.27	.33

PETROLEUM SOLVENTS AND DILUENTS

Lacquer diluents, tks, East Coast	gal.	...	.11½	...	.11½	...	.11
Naphtha, East tks, wks	gal.	...	.11	...	.11	...	.11
Rubber solvents, East, tks, wks	gal.	...	.11	...	.11	...	.11
Stoddard Solvents, East, tks, wks	gal.	...	.10	...	.10	...	.10
Phenol, U.S.P., drs	lb.	.11¼	.13	.10½	.13	.10½	.11¼
Phthalic Anhydride, cl and lcl, wks	lb.	.13	.14	.13	.14	.13	.14
Potash, Caustics, 88-92%, wks, sol.	lb.	.06¼	.06¾	.06¼	.06¾	.06¼	.06¾
Flake, 88-92%	lb.	.07¼	.07½	.07	.07½	.07	.07½
liquid, 45% basis, tks	lb.	...	.02⅞	...	.02⅞	...	.0275
dms, wks	lb.	.03¼	.03½	.03	.03½	.03	.03½
Carbonate, hydrated 83-85%	lb.	...	.05½	...	.05½	.05½	.05¾
Chlorate crys, kgs, wks	lb.	.11	.13	.11	.13	.11	.13
Chloride, crys, tech, bgs, kgs	lb.	.08	nom.	.08	nom.	.08	nom.
Cyanide, drs, wks	lb.	...	.55	...	.55	...	.55
Iodide, bots., or cans	lb.	1.44	1.48	1.44	1.48	1.44	1.48
Muriatic dom, 60-62-63% KsO bulk unit-ton	ton	...	.53½	...	.53½	.53½	.56
Permanganate, USP, wks dms	lb.	.20½	.21	.20½	.21	.20½	.21
Sulfate, 90%, basis, bgs	ton	36.25	39.25	36.25	39.25	...	36.25
Propane, group 3, tks	gal.	...	.03¾	...	.03¾	...	.03¾
Pyridine, ref., drms	lb.	.45	.45½	.45	.45½	.45½	.46
R Salt, 250 lb bbls, wks	lb.	...	.65	...	.65	...	.65
Resorcinol, tech, drms, wks	lb.	.64	.74	.64	.74	.64	.75
Rochelle Salt, cryst	lb.	.38½	.42	.38½	.47	.43½	.47
Salt Cake, dom, blk wks	ton	...	15.00	...	15.00	...	15.00

l Producers of natural methanol divided into two groups and prices vary for these two divisions; *m* Country is divided in 4 zones, prices varying by zone.
* Spot price is ½c higher.

Current Prices

		Current		1946		1945	
		Low	High	Low	High	Low	High
Saltpeter, grn, bbls.	100 lb.	8.20	8.60	8.20	8.60	8.20	8.60
Shellac, blchd. bone dry, bbls.	lb.	.70½	.71	.42½	.71	.42½	.46
Silver Nitrate, 100 oz, bots 2,500-oz. lots	oz.	.47	.47¾	.47	.47¾	.47	.47¾
Soda Ash, 58% dense, bgs, c-l, wks	100 lb.	...	1.15	...	1.15	...	1.15
58% light, bgs cl.	100 lb.	1.05	1.18	1.05	1.18	1.05	1.13
Caustic, 76% flake drms, cl	100 lb.	...	2.70	...	2.70	...	2.70
76% solid, drms,cl	100 lb.	...	2.30	...	2.30	...	2.30
Liquid, 47-49%, sellers, tks	100 lb.	...	1.95	...	1.95	...	1.95
Sodium Acetate, anhyd. dms	lb.	.08½	.10	.08½	.10	.08½	.10
Benzoate, USP dms	lb.	.46	.52	.46	.52	.46	.52
Bicarb, tech., bgs., cl., works	100 lb.	1.55	1.90	1.55	1.90	1.55	1.90
Bichromate, bgs,wks l.c.l.	lb.	.07⅞	.08⅛	.07⅞	.08⅛	.07½	.08⅛
Bisulfate powd, bbls, wks	100 lb.	3.00	3.60	3.00	3.60	3.00	3.60
35° bbls., wks	100 lb.	1.40	1.65	1.40	1.65	1.40	1.65
Chlorate, kgs, wks c.l.	lb.	...	.06½	...	.06¾	...	.06¼
Cyanide, 96-98%, wks	lb.	.14½	.15	.14½	.15	.14½	.15
Fluoride, 95%, bbls, wks	lb.	.07¼	.08¼	.07¼	.08¼	.07¼	.08¼
Hyposulfite, cryst, bgs, cl, wks	100 lb.	...	2.25	...	2.25	...	2.25
Metasilicate, gran, bbl, wks c-l	lb.	...	2.50	...	2.50	...	2.50
Nitrate, imp, bgs	ton	...	33.00	...	33.00	...	33.00
Nitrite, 96-98% bbl. cl.	lb.	...	.06¾	...	.06¾	...	.06¾
Phosphate, di anhyd. bgs. wks.	100 lb.	6.00	6.75	6.00	6.75	6.00	7.25
Tri-bgs, cryst, wks	100 lb.	2.70	3.10	2.70	3.10	2.70	3.45
Prussiate, yel, bbls. wks	lb.	...	.11	...	.11	...	.11
Silicate, 52°, drs, wks	100 lb.	1.40	1.80	1.40	1.80	1.40	1.80
40°, drs, wks, c-l	100 lb.	...	.80	...	.80	...	.80
Silicofluoride, bbls NY	lb.	.06½	.07½	.06½	.10	.06½	.10
Sulfate tech, Anhyd, bgs	100 lb.	1.70	2.20	1.70	2.20	1.70	2.20
Sulfide, cryst c-l, bbls, wks	100 lb.	...	2.40	...	2.40	...	2.40
Solid, bbls, wks	lb.	3.15	3.90	3.15	3.90	3.15	3.90
Starch, Corn, Pearl, bgs	100 lb.	...	4.97	...	4.97	...	4.08
Potato, bgs, cl	lb.	.16	.18	.16	.18	...	.0637
Rice, bgs	lb.	no stocks		no stocks		no stocks	
Sweet Potato, bgs	lb.	no stocks		no stocks		no stocks	
Sulfur, crude, mines	ton	...	16.00	...	16.00	...	16.00
Flour, USP, precp, bbls, kgs	lb.	.18	.30	.18	.30	.18	.30
Roll, bbls	100 lb.	2.40	2.90	2.40	2.90	2.40	2.90
Sulfur Dioxide, liquid, cyl	lb.	.07	.08	.07	.08	.07	.09
tks, wks	lb.	...	.04	...	.04	...	.04
Talc, crude, c-l, NY	ton	...	13.00	...	13.00	...	13.00
Ref'd, c-l, NY	ton	13.00	21.00	13.00	21.00	13.00	21.00
Tin, crystals, bbls, wks.	lb.	no stocks		no stocks		no stocks	
Metal	lb.	...	.52	...	.52	...	.52
Toluol, drs, wks	gal.	...	.32	...	.32	...	.33
tks, frt all'd	gal.	...	.27	...	.27	...	.28
Tributyl Phosphate, dms lcl, frt all'd	lb.	...	.49	...	.49	...	.47
Trichloroethylene,dms,wks	lb.	.08	.09	.08	.09	.08	.09
Tricresyl phosphate tks	lb.	...	.24	...	.24	...	.24
Triethylene glycol, dms.	lb.	.18½	.19½	.18½	.19½	.18½	.19½
Triphenyl Phos, bbls	lb.	.31	.32	.26	.32	.26	.31
Urea, pure, cases	lb.	...	.12	...	.12	...	.12
Wax, Bayberry, bgs	lb.	no stocks		no stocks		no stocks	
Bees, bleached, cakes	lb.	.68	.70	.60	.70	no-stocks	
Candelilla, bgs crude	lb.	.79	.80	.62	.80	.35	.36
Carnauba No. 1, yellow, bgs, ton	lb.	1.88	1.90	1.80	1.95	no stocks	
Xylol, Indus. frt all'd, tks, wks	gal.	...	.26	...	.26	...	.27
Zinc Chloride tech fused, wks	lb.	.05	.0535	.05	.0535	.05	.0535
Oxide, Amer, bgs, wks	lb.	.07¼	.07½	.07	.07½	.07	.07½
Sulfate, crys, bgs.	100 lb.	3.40	4.15	3.40	4.15	3.40	4.15

OILS AND FATS

Babassu, tks, futures	lb.	...	.12	.11	.12	...	.111
Castor, No. 3, bbls	lb.	.13¾	.15½	.13¾	.15½	.13¾	.14¾
China Wood, drs, spot NY	lb.	.39	.41	.39	.41	.39	.41
Coconut, edible, drs NY	lb.	...	.0985	...	.0985	...	.0985
Cod Newfoundland, dms.	gal.	.88	.90	.88	.90	.85	.90
Corn, crude, tks, wks	lb.	...	.12¾	...	.12¾	...	.12¾
Linseed, Raw, dms, c-l	lb.	...	.1770	...	.1770	...	.1550
Menhaden, tks		...	.1225	...	.1225	...	.1225
Light, pressed, drs l.c.l	lb.	...	.1620	...	.1620	...	.1300
Palm, Niger, dms	lb.	...	.0865	...	.0865	...	.0865
Peanut, crude, tks, f.o.b. wks	lb.	.12⅜	.13⅜	.12⅜	.13⅜	.12⅜	.13⅜
Perilla, crude dms, NY	lb.	no stocks		no stocks		no stocks	
Rapeseed, New Orleans, bulks	lb.	...	.13	...	.13	...	.156¼
Red, dms	lb.	.13¼	.14¼	.13¾	.14¼	.12¾	.14¼
Soy Bean, crude, tks, wks	lb.	...	.1175	...	.1175	...	.1175
Tallow, acidless, bbls	lb.	...	.14¼	...	.14¼	...	.14¼

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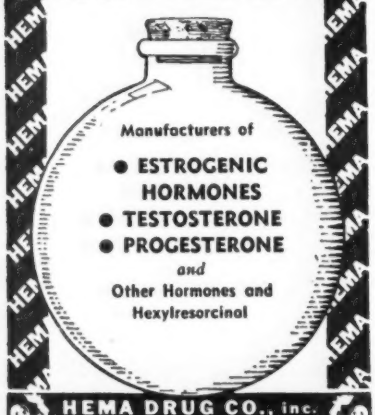

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4—2000 gal. vertical steel Storage Tanks.
1—Union 10x20x12″ Dry Vacuum Pump.
1—1800 gal. agitated Steel Mash Tub.
4—Water Stills: 10 and 25 GPH.
1—40″ Tolhurst self-centering Centrifugal.
1—300 gal. jack. agit. glass lined Tank.

What equipment have you for sale?

LOEB EQUIPMENT SUPPLY CO.

920 North Marshfield Ave., Chicago 22, Ill.

FOR SALE

10 RUBBER LINED

TANKS

55″ Long—50″ Wide—129″ Deep

New

APEX STEEL & SUPPLY CO.

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FMC

"FIRST" brings you new and greater SPACE STOCK —IN ADDITION "FIRST" MACHINERY BIGGEST UP-TO-DATE

IN NEW YORK CITY
new and greater
HEADQUARTERS
157 HUDSON ST.

Greatly increased storage, shop and office space enables FMC to offer better service in supplying equipment. An augmented Sales and Engineering Staff, much more extensive Machine Shop, a bigger force of trained mechanics and everything under one roof saves you time and effort.

On display, you will find literally hundreds of New and Rebuilt units in equipment which you are seeking. AND if FMC doesn't have it in stock, we know where it is. Our INDEX of available machines, is so arranged that in a minute or two a full description, location and other detail are all "on tap" for you. This INDEX is checked constantly and additions and deletions are made daily to keep it constantly up-to-date.

A *big league* staff of engineers, consultants and correspondents are prepared to answer all inquiries promptly. Our new switchboard has greatly increased capacity so your call to WOrth 4-5900 will receive instant attention.

FMC

AUTOCLAVES
4 Horizontal Autoclaves—double door 5' x 11' with 2 roll-in trucks.
4 Vertical Jacketed Autoclaves 4' x 6'.
3 Forged—Welded Autoclaves 300 PSI 6' x 21'.
1 Blaw Knox 125 Gal. Welded Steel Autoclave 3' x 3' Jacketed and Agitated.
1 Devine Autoclave or Impregnator, Jacketed 31" x 36".
1 Seamless Steel Autoclave 1200 PSI 29" x 9' agitated.
1 Blaw Knox Autoclave 30" x 60", Bolted cover—1000 PSI.

CENTRIFUGALS
1 Tolhurst 40" Stainless Steel Basket Centrifugal Extractor with 25 H.P. motor.
1 Tolhurst 40" with Bronze Basket with 10 H.P.
1 Bird 40" Suspended Type Extractor with 2 Speed, 25 H.P. motor.
4 Troy, American, Tolhurst Laundry Type Centrifugal Extractors, 20" to 30"—Bronze and Iron Baskets.
1 Sharples No. 6 Centrifuge tinned contact parts—clarifier type.

COLLOID MILLS
3 Premier Colloid Mills from 3 to 40 H.P. motors.
2 Chemi-Colloid Mills 3 and 10 H.P.
3 U. S. Horizontal Colloid Mills—1½ to 15 H.P. doubled motored units.
4 Eppenbach Colloid Mills ½ to 5 H.P.
1 Bartlett & Snow No. 1 Triple Action Colloid Mill 7½ H.P.

COLUMNS
1 Copper Alcohol Distillation Unit, 36" Diameter—23' high—bubble cap, Sectional type.
1 Steel Alcohol Concentrating Column 62" Diameter having 24 sections 14" high—cap. 400 gal. 190 proof.
1 Steel Fractionating or Bubble Cap Column—30" Diameter x 32' high.

COMPRESSION BELTS OR SEALERS
4 Standard Knapp Units, 10' and 20'.

CONDENSERS
1 Copper Single Pass Condenser 18" x 8' long with 1¼" Copper Tinned Tubes—105 sq. ft.
1 Devine Iron Surface Condenser 8" x 57" with receiving tank.
1 Aluminum Condenser 9'6" long having 64 tubes ¾"—or 150 sq. ft.
2 Surface Condensers or Heat Exchangers—each unit has 5256 tubes—1"—and 17' long 2800 sq. ft.
1 Surface Condenser having 1100 tubes ¾" x 18' long.

DICERS
2 Sterling Model 1 D Dicers with extra sets of dies: B.D.
1 Anderson Dicer complete with motor and dies.

DRYERS
2 Buffalo Double Door Vacuum Shelf Dryers, 20 shelves, size 60" x 160" with Vacuum Pump and Condenser.
1 Ross 4 Pass Continuous Conveyor Dryer, 60' long, with accessories.
2 Proctor & Schwartz 80 Tray Dryers, 34" x 7' x 6'10".
1 Black & Clawson Double Drum Dryer, 28" x 60" with accessories.
3 Double Drum Atmospheric Dryers, 27½" x 63".
1 Devine Double Bronze Drum Dryer, 3' x 9', with 25 H.P. motor.
1 Buffalo Single Drum Chrome plated Dryer, 5' x 6' with auxiliaries.
1 Buffalo Double Drum Dryer, 32" x 72".
1 Buffalo 5' x 12' Rotary Drum Dryer.
2 Vacuum Drum Dryers, 48" x 40" (1 Iron, other bronze, chromed).
1 Buffalo Vacuum Drum Dryer, 5' x 20'.
1 Rotary Vacuum Dryer, 3' x 18' with auxiliaries.
2 Galland & Henning Steam Tube Dryes, 6' x 30'.
1 Gehnrich Gas Dryer 41" x 58" x 30½".
2 Stokes Laboratory Size Vacuum Shelf Dryers.

EVAPORATORS
1 Swenson Single Effect Aluminum Evaporator 3'2" x 5'6" with 200 Aluminum tubes ⅞" x 4'—with Vacuum Pump and Aluminum receiver.
2 Lillie Evaporators 5' x 10' all Copper with 140-3" copper tubes.
1 Buffalo Single Effect Stainless Steel Evaporator, rapid circulating type with pump and condenser.

FILLERS (DRY POWDERS)
1 Stokes & Smith Model G1 Universal Semi-Automatic.
1 Triangle Model SN Auger type, Semi-Automatic.
1 National Packaging F2 Free Flowing Filler.
2 National Packaging Two Station, Automatic Auger Fillers.
3 Scott Scales and Hoepner Weigh Type Fillers.
1 Triangle Elec-Tri-Pack Filler, Free Flowing 3 oz. to 3 lbs.
8 Day, Spout-Waldron, Jeffrey and Howe, Sack and Barrel Packers.

FILLERS (Soups—Pulps—Catsup—Pea & Bean—Vegetables, etc.)
M. & S., Haller, Ayers, Hansen, etc.

FILLERS (Tube)
1 Stokes 79 D Filler, Closer and Crimper.

We Buy Complete Plants

See PAGE 250 of the DISPLAY ADVERTISING

FIRST

SERVICE STAFF
REBUILDING FACILITIES
ACCESSIBILITY

TO WHICH OFFERS THE COUNTRY'S MACHINERY INDEX

FILLERS (Preserves—similar)
8 Karl Kiefer Visco Fillers, gear and piston type.

FILLERS (Light Liquids, Oils, Shampoos, Salad-Dressing, etc.)
New FMC Straight Line Syphon Fillers.
New FMC Rotary Syphon Fillers.
New FMC Straight Line Vacuum Fillers.
1 Samco all Automatic 8 Spout Vacuum Filler.
1 Samco Jr. 6 Spout Vacuum Filler.

FILTERS
1 Shriver 18" Wood Pl. & Fr. Filter Press.
1 Shriver Cast Iron 24" Pl. & Frame, Filter Press with pump and motor.
1 Shriver 30" C.I. Pl. & Fr. Filter Press.
1 Industrial all Iron Rotary Filter Drum 6' x 3'.
2 Oliver Filters 5' x 6'—Steel construction.

HEAT EXCHANGERS
1 Griscomb-Russel 7 Pass Stainless Steel Heat Exchanger. (See Condensers)
75 Jacketed Kettles in stock, Stainless, Copper, Iron, etc., up to 1000 gal. capacity.

LABELERS
6 Semi-Automatic Bottle Labelers—World, Ermold, National.
2 Burt & Standard Knapp Can Labelers.
1 Week's Straight Line Automatic Duplex Front & Back Labeler.

MILLS (Ball & Tube)
4 Hardinge Conical; 5' x 22"; 6' x 48";—(2)—8' x 30".
1 Abbe Ball Mill, 40" x 58"—arranged for M.D.
3 Stearns Rogers Tube Mills, 5' x 22'.
3 Allis Chalmers 7" x 24' Tube Mills.
1 Allis Chalmers 8' x 22' Tube Mill.

MILLS (General)
2 Raymond No. 45 Imp Mills complete with accessories.
3 Raymond No. 00 and No. 0000 Mills.
2 Raymond No. 1 Mills—P.D.
1 Stedman Cage Mill arranged for (2) 75 H.P. motors (not included).

MIXERS (Paste, Paint, Semi-Liquids)
1 Ross 50 Gal. Paste Mixer 24" x 19½".
1 Ross 150 Gal. Paste Mixer 36" x 36".
1 Battery of Kent Paste Mixers, 30" x 30".
12 Lead Mixers—50, 60, 100 gal.

MIXERS (Heavy Duty—Semi-Solids)
3 Simpson Intensive Mixers, 6'; 4' and 18".
4 W. & P. Jacketed Mixers, 2 gal., 9 gal. and 20 gal.
1 P. & J. Jacketed Hor. Mixer 34" x 40" x 50", double elliptical arms—requires 2 motors.
1 Abbe Double Z Arm Mixer—137 Gal. Cap.—with 7½ H.P. motor.

MIXERS (Dry Powder)
1 Day Model G 2000 lb. Mixer.
1 Sprout Waldron 3000 lb. Vertical Mixer.
12 New FMC Dry Ribbon Mixers up to 3000 lbs.
1 Gedge Gray 6000 lb. Hor. Mixer.

PULPERS
2 Chisholm Ryder American Utensil Model B Stainless Juice Extractors.
2 Langsenkamp Model B Juice Extractors, Nickel or Stainless.
3 Lanksenkamp Bronze Model A Juice Extractors.
1 Sprague Lowe Conical Pulper.

PUMPS (Rotary, Centrifugal, Gear, Steam, etc., send us your inquiry)

SIFTERS
8 Rotex & Ro-Ball Sifters from 20" x 40" to 40" x 84"—single and multiple separations.
3 Schutz-O'Neill Robinson & Combs Gyratory Sifters.

STILLS
12 Vacuum Stills in Copper, Steel, Aluminum—Jacketed—Coiled—all sizes.
1 Glass Lined 3000 Gal.—Sectional Still.
3 Bubble Cap Stills (see Columns).
1 Copper Gin Still 300 gal. 5' dia.
1 Buffovac Nitric Still 80 Bbl. capacity.—96" x 108" with oil burner.
1 New Stainless Barnstead Still, No. 88 100.
9 Other Water Stills—gas or steam operated in all capacities.

TABLET MACHINES
75 Stokes & Colton, Single Punch and Rotary Tablet Presses for practically every requirement.

TANKS
Steel Storage Tanks—Vertical and Horizontal always in stock. Stainless Steel Tanks some with agitators—state specifications required.

MISCELLANEOUS
1 Fitzpatrick Stainless Steel Comminuting Machine Model D.
1 Ronneburg 5 ton Screw Press with Dryer (Oil Burner), 50 H.P. motor and accessories.
1 Bartlett Snow Horizontal Digester 6' x 18' with ¾" steel shell.
1 Dapp 1500 lb. Crutcher; 42" x 40".
3 Crystallizers or Vacuum Drying Pans 5' and 7'6" Dia. complete with accessories.
2 Allis-Chalmers Rotary Coolers 8' x 83' arranged for M.D.
2 Heavy Copper Tanks, Horizontal 4'4" x 12' dished heads.

or Individual Items

IN CHICAGO
at the Coliseum
BOOTH N6
at the
CHEMICAL SHOW

Several of our top executives will man our space at the Chemical Show prepared to give you full information on the spot on the equipment you are seeking or wish to dispose of.

An ample stock of literature will be there for your edification. A few of our machines will be on display but naturally, limited space will allow only a minimum number.

Regardless of whether you are seeking an individual unit or a complete plant consult our representative in Booth N6. A courteous reception will greet you. Constant contact with our New York offices will be maintained.

Copies of our newly issued Bulletin, now on the press, will be ready for distribution and the New FMC 97 Page Catalog will be yours for the asking. See FMC in Chicago.

FMC

MACHINERY CORPORATION

157 HUDSON ST. NEW YORK 13, N. Y.
PHONE: WORTH 4-5900

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NATIONAL CHEMICAL EXPOSITION

SEPTEMBER 10-14, 1946

See our 4-page insert in the Chemical Industries Supplement

DRYERS

1—Devine VACUUM SHELF DRYER, 14 shelves, 40x43.

3—B. & C. 28" dia. x 60" face Amospheric DOUBLE DRUM DRYERS complete.

1—32"x72" BUFLOVAK ATMOSPHERIC DOUBLE DRUM DRYER, m.d.

9—Direct heat ROTARY DRYERS; 4'x30', 5'x30', 70"x30", 6'x60'.

1—ROTARY KILN, 6'x60'.

5—ROTARY VACUUM DRYERS: 1—Devine, 5'x30'; 3—Devine, 4'x25'; 1—Devine, 4'x30'; 1—Struthers Wells, 30"x12'.

1—6'x35' Louisville Direct Heat single shell Rotary Dryer.

2—Buffalo 6' Vacuum and Atmospheric CRYSTALIZERS.

Aluminum
VACUUM STILLS, KETTLES, TANKS

4—Closed jack. agitated Kettles with coils; 3—1,200 gal., 1—900 gal.

1—1,200 gal. closed jack. Kettle or Vacuum Still.

3—Closed jack. agitated Kettles or Vacuum Stills.

2—250 gal. Copper jack. agit. closed Kettles or Vac. Stills, one with coils.

1—350 gal. closed jack. agit. Kettle.

1—80 gal. jacketed open Kettle.

1—100 gal. open Tank.

40—250 gal. NEW CLOSED HORIZONTAL STORAGE TANKS, OVAL SHAPED, APPROX. 46" AND 28" BY 61" LONG, 18" ROUND MANHOLE IN TOP, 1/8" PLATE.

SPECIAL PURCHASE

1—Colton No. 14 Fully Automatic Tube Filler Filler, Closer and Clipping Machine.

1—Pneumatic Scale, six head, fully automatic Capping Machine.

5—World and Ermold semi-automatic Labeling Machines, MD.

7—W & P MIXERS, 150 gallon capacity, 100 gallon working capacity, size 15, style VI, type BS, equipped with sigma blades, fully motorized. NEW, unused.

58—Phila. GEAR REDUCERS, Ratio 88:1, 16.7 H.P. at 1750 RPM.

37—Phila. MOTO-REDUCERS, 2 H.P. 2-speed, explosion-proof motors.

16—Eastern VERTICAL AGITATORS, 3 H.P. explosion-proof motors, output speed 225 RPM.

6—PEBBLE MILLS. 1—6' x 5' Burrstone Lined; 1—32" x 42" Rubber Lined; 4—30 gal. porcelain lined. Other Sizes.

1—24" x 24", Jeffrey single ROLL CRUSHERS.

5—DRY POWDER MIXERS various sizes. To 3000 lbs.

6—RAYMOND PULVERIZERS: 4-roll high Side; No. 1, No. 0000.

12—OLIVER FILTERS, 4' x 6'; 6' x 6', wood and iron; 8' x 8'; 8' x 12'.

8—HEAT EXCHANGERS, 50 to 1600 sq. ft. heating surfaces; 5 copper, 2 steel tubes.

23—CENTRIFUGAL EXTRACTORS, 12" to 72" bronze and steel baskets, belt and motor drives.

1—PNEU. SCALE CARTON PACKAGING UNIT.
1—Pneumatic Scale Co. Auto tight WRAPPER.
1—36" dia. Cast Iron COLUMN, 23' high.
3—8' x 30" Hardinge Conical Silex Lined PEBBLE MILLS, also 6' x 36".
1—5' x 13' PEBBLE or TUBE MILL, with open trunions.
9—Dopp C. I. Jacketed KETTLES, 25 gal. to 100 gal.; 30—steel, cast iron jack, up to 2000 gals.
3—ROLLER MILLS, 12 x 30, 16 x 40 water cooled.
9—COPPER & ALUMINUM steam jack. KETTLES 50 to 500 gal., some with agitators.
1—Richie friction grease TESTING MACHINE, cap. 10,000 P. S. I.
1—World automatic rotary LABELER m.d.
1—700 gal. lead-lined closed TANK, lead coils; other sizes.

4—150 gal. aluminum TANKS, cone bottom.
1—Stokes No. 21 GRANULATING MIXER 50 lb.
2—Jones Automatic CARTONERS.
2—Anderson PACKAGING UNITS.
1—U. S. Bottlers 22-spout Rotary Vac. Bottle Filler complete m.d.
3—Sharpless No. 6 Clarifiers and Separators, m.d.
4—DeLaval Clarifiers and Separators, m.d.
1—400 gal. horiz. rubber lined MIXER.
1—500 gal. Jack. agit. AUTOCLAVE, steel hammer welded construction 200 lb. jack press, 500 lb. internal press.
1—50 gal. J. H. Day Imperial Vacuum STAINLESS STEEL MIXER, A.C. motor.

CASH FOR YOUR SURPLUS MACHINERY—Send Us Your List

JUST PURCHASED
Chemical Perfume Plant

4—All-Copper VACUUM PANS, with condensers; 1—275 gal.; 1—250 gal., 1—60 gal., 1—50 gal.

2—25 gal. Copper Jacketed Evaporating Pan.

1—60 gal. Copper Jacketed Evaporating Pan.

1—Porcelain-lined Pebble Mill.

1—J. H. Day Drug Mixer.

13—400 lb. All Copper Percolators.

8—200 lb. All Copper Percolators.

5—100 gal. Closed Copper Tanks.

Miscellaneous small copper tanks, crocks, stone percolators, stone filters, etc.

"AMERICA'S BEST BUYERS" WANT YOUR IDLE EQUIPMENT

SINGLE ITEMS TO COMPLETE PLANTS

SEND YOUR LIST NOW

THE KEY TO SAVING TIME AND MONEY

CONSOLIDATED PRODUCTS COMPANY, INC.

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"EVERY MACHINE IN YOUR PLANT IS A USED MACHINE"

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WIDE VARIETY OF EQUIPMENT.

LARGE CHEMICAL PLANT

• MACHINERY • EQUIPMENT
• LAND • BUILDINGS

No Matter What Your Chemical or Industrial Process, You Should Find What You Need In This Great Plant!

15—All Copper RECTIFYING COLUMNS, 54", 48", 42", 40", 30", and 24" dia. Copper Tube Dephlegmators, Condensers, Calandrias, Preheaters, Instrument Controls, etc. for above Columns.

30—Miscellaneous Steel Storage TANKS, vertical and Horizontal, 200 to 22,000 gallons capacity. All clean on inside, used for alcohol.

10—Steel Sheet Copper Tube Surface CONDENSERS, each 150 1½" x 7' Copper Tubes.

18—All Bronze CENTRIFUGAL PUMPS, with stellited shafts, direct motor driven. Sizes 2½ x 1 and 1½ x 1.

2—DeLaval 2400 GPM 2-stage centrifugal pumps, motor driven, 150 HP, 3/60/2200 volts.

2—500 HP—B & W Sterling BOILERS, 250# pressure, Class H4—#24. Complete, still set, installed new 1942.

1—Baldwin 27 Ton Saddle Tank LOCOMOTIVE, 6-wheel, std. gauge.

1—Baldwin 10 Ton 30" gauge Electric Mine LOCOMOTIVE, 230 volt, DC, overhead trolley.

1—#450 Kelly FILTER Iron Leaves.

Large Stock New Copper, in sheets and circles, valves, supplies, etc.

Complete Copper, Blacksmith, Machine Shop.

Large variety of Motors. Send for List.

Ask for your copy of PRINTED CIRCULAR listing everything in detail.

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NEWBERRY MANUFACTURING CO.

P. O. Box 295, Newberry, Michigan
Telephone NEWBERRY 16

New York Agent:
Consolidated Products Co., Inc.
17 Park Row, New York 7, New York

UNION Rebuilt Machinery Established 1912

SPECIALS

Just Received!

UNION Rebuilt Machinery Established 1912

3—Mikro Pulverizers—1 Late Model 1 SH; 2 Mikro 4 TH 24" Machines.
1—100 gal. Glass-lined Vacuum Pan with heavy duty Agitator.
Copper Steam Jacketed Vacuum Pans, 2', 32", 4', 5', 6', with and without Heavy Duty Agitator.
1—Shriver #30 Filter Press, closed type delivery with Visible Fittings, other sizes and types in stock.
1—3-ton Spiral Mixer.
2—9' Chasers or Mullers, also other sizes.
1—Karl Kiefer Visco Filler.
1—Gayco 4' Air Separator and Sifter.
Lehman and Day 12" x 30" Three Roll Mill, Kent 9" x 24" Size Mill.
Ermold Semi-Automatic Labeler—World Fully Automatics.

All Machines Are Offered Subject to Prior Sale

Write for Latest Circulars • Wire Collect for Prices and Details

UNION STANDARD EQUIPMENT COMPANY

318-322 LAFAYETTE STREET, NEW YORK 12, N. Y.

SPECIALS

2—Davis 500# Powder Mixers (NEW)
1—Copper Tank, 10' x 8' with Coils
1—Terry 10 H. P. Steam Turbine.
1—Double Pipe Heat Exchanger 3" x 4½".
1—Shuntz O'Neil 4 Roller Mill.
1—Bufalovak 7' Diameter Stainless Vacuum Pan.
2—Williams Hammer Mills, Size #1.
2—Allis Chalmers Pumps, 2,000 G. P. M.
7—Groen Stainless Clad Kettles, 20 gallons.
1—Buffalo Vacuum Drum Drier, 48" x 40".
1—36" x 18'0" Jacketed and Agitated Mixer.
2—Downie Stainless Centrifugal Pumps, 8" x 5".
1—Oliver 3 x 2 Rotary Filter.
70—NEW Stainless Steel Tanks, 30-500 gallons.
62—NEW Bronze Turbine & Centrifugal Pumps.
42—NEW Portable Agitators.

When visiting the Chemical Show in September contact our representative at Hotel Stevens.

Write for Latest Stock List

PERRY

EQUIPMENT CORP.

1521 W. Thompson St., Phila. 21, Pa.

---

20 Ton Whitcomb Gas Locomotive
100—Box & Gondola Cars
128—10,000 & 8,000 gal. Tank Cars
2—2,000 to 4,000-gal. Emulsion Colloid Mills
6—100, 150 & 200 H.P. Diesel Units
343 KW 3/60/2300 F. M. Diesel
480 KW 2300 V Diesel Generator
Raymond No. 0 Automatic Pulverizer
5' x 33' Steam Jacketed Vacuum Dryer
8—3 x 4 and 4 x 7 Hummer Screens
3 x 30, 3½ x 24, 5½ x 60, 6 x 40 and 6 x 59 Direct Heat Dryers
18 x 36 and 42 x 10 Acme Jaw Crushers
20 H.P. Charlotte 1½ in. Colloid Mill
1 yd. P. & H. 50' Boom Cart, Crane

STORAGE TANKS

14—10,000, 15,000, 20,000 and 26,000-gal. Cap. Horizontal and Vertical
25—21,000 and 41,000 gal. Vert. Tanks

AIR COMPRESSORS

Electric—540, 676, 1,000 and 1,578 ft.
Diesel—360, 500, 700 and 1,000 ft.

R. C. STANHOPE, INC.
60 East 42nd St. New York, N. Y.

SPECIALS

3—Model 1SH Mikro Pulverizers, motor driven, motors
3—Evaporators, Double, Triple, Quadruple Effect, details on request.
17—Bucket Elevators, 12' to 50' high, steel housing, motor driven
1—Battery of 2 Tolhurst 40" Suspended Type Centrifugals, 15HP motor driven
1—Buflovak 24" x 20" Vacuum Drum Dryer
1—Dia 5' Copper Jacketed, Agitated Kettle
8—Powder Mixers, 1000 to 3000 lb.
1—16" Troughing Belt Conveyor, 175'
1—American 6' dia. 2 Disc Rotary Filter
1—FEINC 3' x 2' Steel Rotary Vacuum Filter
8—Sperry, Shriver Cast Iron Filter Presses, 12" to 36" square
2—6' x 27'5" Rotary Steam Tube Dryers
4—Rotary Vacuum Dryers, 1½' x 3½', 4' x 12', 4' x 15', 5' x 33'
3—Model 1SH Mikro Pulverizers, with 5 HP motors
6—Oliver 8' x 6' Stainless Steel Rotary Continuous Filters. NEW.
2—5' x 6', 5' x 12' Atmospheric Drum Dryers
5—Copper Vacuum Pans, to 6' dia.
2—Readco 100 gal. Jacketed Double Arm
1—Hardinge Mill 4½' x 24", manganese lined.
3—Sharples No. 6 Centrifuges
3—DeLaval No. 600 and 700 Clarifiers
2—Buflovak 6' dia. Vacuum Crystallizers
1—Pfaudler 287 gal. Nickel Lined Jacketed Kettle
10—12" Belt Conveyors, up to 80'
1—Schoeffer Poidometer, 20" x 4'

Partial list only. Your inquiries solicited.

BRILL *Equipment Company*

225 W. 34th Street, New York

GET RESULTS!

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CHEMICAL INDUSTRIES

Classified Section

AVAILABLE

2—DEVINE #11 Vacuum Shelf Dryer 40" x 48"
1—ROSS 4 Pass Dryer 58' Long
1—BUFFALO FDY. 24" x 20" Bronze Drum Dryer with Scraper Knife
4—SHRIVER 30" Cast Iron Filter Presses
1—SHRIVER 18" Cast Iron Filter Press
1—SHRIVER 12" Cast Iron Filter Press
1—TOLHURST 48" Suspended Centrifuge

Send for Bulletin A-6

WHAT HAVE YOU FOR SALE?

MACHINERY & EQUIPMENT CORPORATION (of N. Y.)
533 West Broadway New York 12, N. Y.
GRamercy 5-6680

FOR SALE

50	500 Barrels
10	1,000 Barrels
18	5,000 Barrels
1	10,000 Barrels

New A.P.I. closed bolted type steel tanks located at Ogden, Utah.

20—new 1000 bbl. 8 gauge, closed aluminum bolted type tanks.

4—used heavy riveted and welded steel tanks, 10'6" x 30'2", 1" thickness throughout, suitable for pressure.

Also a large quantity of other size tanks. New and guaranteed used steel pipe up to 36" inclusive.

JOS. GREENSPON'S SON PIPE CORP.
National Stock Yards, Ill.

FOR SALE

1—150 Gal. per 8 Hr. Methyl Methacrylate Monmer Distillation Unit complete.

1—150 Gal. per 8 Hr. Prepolymerization Vat with Condenser.

Brand new; in original crates. Immediate delivery.

For price and detailed information, address box 3049, Chemical Industries,

We Buy and Sell at Any Point New and Used Tight and Slack Barrels; Steel Drums and Cans.

BUCKEYE COOPERAGE CO.
3800 Orange Avenue
Cleveland 15, Ohio

HELP WANTED

LATIN-AMERICAN SALES REPRESENTATIVE

Wanted—by prominent internationally known manufacturer, qualified person with experience in drugs, pharmaceuticals, and chemicals. Must speak Spanish fluently and be willing to travel. Write Box 3027, 522 Fifth Ave., New York 18, N. Y., giving complete information including age, experience, etc.

SALES ENGINEER TRAINEES WANTED: 3 or 4 young men to train as sales engineers; ex-servicemen preferred. Must have sales personality, sound character, and an Engineering Degree or its practical equivalent. Applicants should be prepared to receive home-office training for approximately one year before settling in or traveling any section of country. Starting salary commensurate with background and individual ability. Sprout, Waldron & Company, Muncy, Pennsylvania.

Chemical Engineer desired by established Philadelphia firm manufacturing industrial organic products. Must be capable of taking charge of plant, future pilot plant operations and production. Experience in organic chlorinations desired. Marvelous opportunity for promotion and salary increases. In reply please give age, references, salary expected and summary of past experiences. Replies confidential. Box 3048.

Chemical Industries, 522 Fifth Ave.,
New York 18, N. Y.

Chemist or Wood Technologist—Excellent opportunity in laboratory of large manufacturer wood adhesives. Location 200 miles from New York City. Experience in adhesive application or other wood working preferred. Write giving full information regarding training, experience, age, salary expected, and include snapshot. Box No. 3050, Chemical Industries, 522 Fifth Ave., New York 18, N. Y.

RESIN SALES REPRESENTATIVES Wanted. Young manufacturing concern will make commission or other arrangements. Urea-Formaldehyde and Phenol-Formaldehyde Resins available in liquid, lump, pulverized and spray-dried forms. Also Contact-Pressure Resins. Box 3032, 522 Fifth Ave., New York 18, N. Y.

Chemical Engineers and Chemists (all Branches) attractive positions available through Chemical Department, Position Securing Bureau (Agency), 45 John Street, New York.

EXPERIENCED SALESMEN WANTED—in any of 11 Western States. Top earnings. Progressive Manufacturer of Cleaning Compounds, Chemicals and Janitor Supplies. State experience, qualifications and earning.
GLOBE SANITARY SUPPLY COMPANY
2249 East 38th Street, Los Angeles 11, Cal.

RUBBER CHEMICALS ETC. What have you for sale to New England factories. Brokerage Basis. If you are not covering this territory at the present time please get in touch with us. Box 3053, Chemical Industries, 522 Fifth Ave., New York 18, N. Y.

SITUATIONS WANTED

EMULSION and Resin Chemist—19 years' experience in development and supervision of productions of surface coatings including emulsion paint, pigment dispersions, resin emulsions, wax and resin finishes, and lacquer emulsions. Proven executive ability. Chicago area. Box 3051.

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Use

CHEMICAL INDUSTRIES

CLASSIFIED SECTION

PATENTS

Dyestuffs

(*Continued from page 267*)

forces. Since the termination of hostilities in August of 1945, manufacture has been returned to the production of the more varied and, in general, brighter shades required for civilian use. Research has been resumed and amplified on the further improving of the established lines of colors, to develop new dyes of superior wearing properties and of easier application. Among the unsolved problems facing the dye industry is that of satisfactory colors for the new synthetic fibers such as Nylon, Vinyon, Saran, etc. These new fibers differ markedly from each other and from the older fibers in dye receptivity, and, as their resistance to the chemical action of the materials encountered in use (sunlight, soap, water, alkali, perspiration. oxygen, etc.) increases, so, naturally does their resistance to dyeing. Pigment printing is satisfactory in light shades only, and no dye can be applied to Nylon, for example, that will show the light and washing fastness of vat colors on cotton. Intensive research on this problem is under way in the laboratories of the dye industry on this problem and the even more complex and difficult one of dyeing these new fibers in combination with each other and with the older ones. Not unlikely it will be necessary to find new coloring techniques as well as new colors. In view of the accomplishments of the past it seems reasonable to expect that this will be done, and that with these new fibers and those still to be produced, the dye chemist will produce dyes worthy of the fibers that they adorn.

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Between the Lines

(*Continued from page 302*)

"The entire merchant industry is confronted with the same fate—not immediately, but certainly," said Mr. Morris.

The extent to which coal carbonization products furnish raw materials for industry was illustrated further by Edmund O. Rhodes.

	Per cent derived from		
	Coal Carbonization Products	*Petroleum and Natural Gas*	*Agricultural Products*
Chemical Intermediates	45.4%	27.3%	27.3%
Dyes and Colors	100.0	00	00
Medicinals	92.8	00	7.2
Flavors and Perfumes	58.6	17.4	24
Plastics and Resins	65.8	17.1	17.1
Rubber Chemicals	76.4	20.6	3.0

"It is obvious," he said, "that while chemicals from coal carbonization make up but a small proportion—about 1.5 percent—of all products from this source, our entire chemical industry is dependent upon them to a very large extent."

In order to obtain even these quantities of chemicals, however, he added, it is necessary to carbonize great quantities of coal and produce large amounts of bulk commodities, which latter must be marketed successfully to make recovery of the chemicals economically feasible.

"Present indications are that potential requirements for several of the coal carbonization chemicals will exceed supplies available from existing and projected coke ovens," this witness testified. "A reduction in carbonizing capacity by the closing of merchant coke ovens would seriously interfere with production of innumerable finished products made from coal carbonization chemicals and upon which much of our national economy and security depend."

This seems to summarize the case for the coke products industry in relation to natural gas competition.

Next month, testimony pertaining to synthetic fuel possibilities will be covered.

Protective Coatings

(*Continued from Page 277*)

ists in the copolymers of linseed with such monomers as styrene, methyl methacrylate, butadiene, etc.

Isomerized linseed and soybean oils are produced commercially. These oils body more rapidly than the original oils. The development of re-esterifying the conjugated fatty acids with higher alcohols, such as pentaerythritol, has proceeded with considerable success.

Petroleum drying oils, which are highly unsaturated hydrocarbon oils, are used as extenders with linseed. Considerable research is continuing in this field; petroleum oils of the future will be used for their own respective values.

Fish oils, particularly menhaden, sardine, and pilchard, are currently used in large quantities in raw, bodied, and chemically treated state. Sorbitol and mannitol oils, obtained by esterifying these alcohols with drying oil acids, have shown good performance in hard varnishes. Likewise, tall oil, a waste product from the kraft paper process, has found a definite place in the coating industry. Normally, it is esterified either with glycerine or pentaerythritol and is permanently established in alkyd resins.

Second in importance only to rosin itself, and ester gum, is pentaerythritol rosin ester, on which a number of maleic and phenolic modified resins are based. Too, the use of pentaerythritol and polypentaerythritol is on the increase.

Phthalic anhydride has been the most important polybasic acid and glycerol the major polyhydric alcohol used in alkyd resins. However, either or both these has been replaced in part or entirely by such alcohols as glycol, pentaerythritol, sorbitol, etc. The replacement of phthalic anhydride with maleic increases the hardness and reduces the air-drying and baking time. Replacement with the straight chain acids, adipic or sebacic, produces softer, more flexible resins. Replacement of the glycerol with alcohols having greater functionality also reduces drying time, whereas replacement with the glycols produces non-drying, very flexible resins.

By using alkyd resins in combination with water-white amino resins it is possible to make white-baking, hard, tough, chemically resistant, refrigerator finishes, impossible a few years ago. These amino resins, first the ureas, and more recently the melamines, find extensive use in such quick-baking finishes.

Methyl-methacrylate coatings are of present interest because of their resistance to yellowing when exposed to elevated baking temperatures. Such clear coatings have good adhesion to plated surfaces, and are widely used in clear finishes for plated metals, and as binders for luminous pigments. Polethylene resins—the first 100 per cent fluid-solid employed in coatings—loom large in electrical insulation applications.

Silicones, organosilicon oxide polymers, are probably one of the most revolutionary recent developments. They open an entirely new field of chemistry for industrial finishes. They possess extreme resistance to very high temperatures, and have excellent electrical properties.

COATINGS

Rather recently, a number of so-called "primer-less" flats have appeared on the market. They are designed, through the judicious selection of pigments and extenders combined with heavy-bodied treated oils blended with suitable resins, to produce a uniform finish over surfaces of widely varying porosity. Many of them do not fall far short of this goal.

The popularity of emulsion paints has been well maintained. Improvement in washability has been effected, and while these paints have been produced largely in flat luster, emulsion paints with gloss characteristics are beginning to appear. When alkyd resins become readily available, more improvement in these paints is to be expected.

The formulation of outside house paints has seen many changes in the composition of pigment. Pigmentation tends toward less lead and increased titanium. The vehicle, however, has remained practically unchanged.

During recent years the Navy experimented with the use of hot plastic anti-fouling paint applied at three times the thickness of ordinary coatings. This covering has given good anti-fouling performance up to 18 months—that is, 6 months longer than the orthodox type of paint. A few disadvantages attend its use, however, namely, its cost, the need of perfectly clean and treated base metal, the use of special equipment and personnel, and the adverse effect of changes in temperature and humidity. Nevertheless, interesting reports of the use of vinyls in anti-fouling compositions should appear soon.

Recent data show that the synthetic resins find many and varied types of industrial outlets but that the paint industry constitutes their largest single consuming market (1944 — 292,566,000 pounds). Actually, over a third of the entire U. S. synthetic resin production goes into the preparation of protective coatings.

PROSPECTS

The nature of our industry is such that it is adapting new chemical products and principles without completely discarding the time tested ones. Old as the paint industry is from the standpoint of art and craftsmanship, it is technologically young, vibrant and progressive and has evolved into a chemical engineering industry. Its growth and welfare is dependent upon continued and vigorous utilization of the new scientific developments which are appearing on the horizon.

Indications for the future of the industry are:

1. An increased consumption of various synthetic resins now in use—alkyds, phenolics, ureas, melamines, vinyls, acrylates, polyterpenes, pentaerythritols, coumarone-indene, chlorinated rubbers, cellulosic derivatives, etc.

2. Coatings made from styrene and styrene copolymers, organosilicones, itaconic acid, allyl polymers, etc., are in the offing.

3. The dream of 100% solids synthetic resin coatings through the use of monomeric substances as solvent carriers for alkyds and other polymerizable resins may soon bear fruition.

4. Isomerized and chemically processed oils, tall oil and tall oil derivatives will be utilized in increasingly larger quantities. Emulsion coatings, infrared-reflecting and anti-fungus paints and luminescent finishes (which came into special prominence during the war) will find ready acceptance in civilian work.

5. New methods of drying (e. g., high frequency induction heating) and new methods of application (e. g., spraying in an electrically induced field) will be adopted more extensively.

6. The new paint coatings will also find new and added markets—floor coverings, packaging, insulation, specialty printing inks, adhesives, textile and paper coating, impregnation and lamination, and the like.

For some of these applications, paints and plastics will find themselves in direct competition. After all, synthetic resins are the basic raw materials of both fields and the time is rapidly approaching when it will be difficult to differentiate in terminology between paints and plastics, except where the latter are used solely as molding materials.

CONCLUSION

Protective organic coatings are a necessary and integral material of construction of all industrial and chemical engineering industries. The present volume of sales is approximately 700 million dollars and should very soon reach a billion dollars.

In the past the industry has advanced much more rapidly chemically in the development of the raw materials than in the development of the chemical engineering processing of coatings. Now more attention is given to the engineering aspects, i. e., in the case of varnish processing, changing from small batches to larger batches (250 to 1000, to 5000 gallons) and continuous processing. In the coming years, the industry will need more technical college graduates, trained thoroughly in the fundamental sciences.

COULD THIS BE YOUR HOUSE?

Now that the war's over and a lot more civilian goods are on the market, it's a big temptation to spend just about all you make, and not put anything aside.

But to fall for that temptation is plenty dangerous. It's like trying to live in the house above—a house that might come tumbling down about your ears at the first little blow of hard luck.

Right now the best possible way to keep your finances in sound shape is to save regularly—*by buying U. S. Savings Bonds through the Payroll Plan.*

These Bonds are exactly like War Bonds. Millions of Americans have found them the safest, easiest, surest way to save. The U. S. A. protects every dollar you invest—and Uncle Sam gives you his personal guarantee that, in just ten years, you'll get *four dollars back for every three you put in!*

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CHEMICAL INDUSTRIES

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INDEX *of* ADVERTISERS

INDEX *of* ADVERTISERS

"WE"— EDITORIALLY SPEAKING

THE PATIENCE of an editor has high elongation and tensile strength. Even so, it would often snap if we didn't have a leavening (or vulcanizing, to stick to the metaphor) sense of humor. We received a letter the other day that starts out, "Dear Sir: Enclosed you will find an atomic bomb!" and went on megalomaniacally to describe "a new scientific principle" which has something to do with "molecular cleavage" of metals.

Much against our better judgment, we looked at the photograph of this amazing, stupendous, colossal atom peeler. It was a broach.

WE'RE WAITING to hear from our editor-in-chief, who is on his way back from Bikini, whether the underwater explosion heated up the water of the lagoon. It strikes us as an ideal way to heat the morning coffee so we can catch the 8:07. That radioactive business doesn't faze us at all—we've been eating restaurant lunches too long to care.

WE'RE ALL AWARE of the fact that caustic soda is pretty hard to come by, but we didn't realize how bad it was until one of our friends in the caustic industry, who was in the office the other day, told us that some customers were sending out female purchasing agents who would "do anything for a carload of caustic."

We hope none of the girls crossed a state line.

ALL YOU HAVE TO DO to get any of the booklets listed in our "Booklets & Catalogs" department is to check the coupon and send it in to us. This is by way of introduction to the fact that one large company which shall remain unnamed sent an invoice in sextuplicate—one for the plant, one for the office, one . . . *ad infinitum ad nauseam*. We could use that paper!

EVERYWHERE WE TURN this relativity business crops up, with space and time mixed together so we can't tell which is which. The *Herald Tribune*, for instance, in describing the Bikini test, says that the force of the bomb surged against "seventy-five ships and twelve landing craft spread out radially to 4,000 years from the detonation."

THE *Monsanto Magazine* tells us that the average woman consumes her height in lipstick every five years.

Do the tall girls put it on thicker?

WE DON'T KNOW offhand what we'd call the stuff you get by heating clay just short of its melting point, but a patent attorney calls it a "spicular, viscular, cellular material created by the incipient intumescence of an argillaceous material." We also glean from *Dorrco Doings*, source of the above intelligence, that such language is necessary to protect the validity of a patent. But not even the marriage service is that complicated!

GUSTAV EGLOFF sends us a clipping of an ad from a Shanghai paper enumerating all the marvelous things that vitamin B_1 will do. We didn't know it was *this* good:

(1) [For] All forms of beri-beri, either preventive or curative.
(2) Disturbances of digestive system and intestinal tract.
(3) Nutritional disturbances originated from the regular diet of white polished rice.
(4) Polyneuritis, neurotic pains, paralysis after diphtheria, neurasthenia, insomnia, pregnancy vomiting, insufficiency in lactation and many other diseases. . . .

It sounds to us more like Chief Wahoo's Famous Indian Elixir in the large economy size.

WE HAVE SOUNDED OFF now and then on the editorial pages about scientists who pose as political pundits. We're encouraged to read that Sir John Anderson, across the Atlantic, sees eye to eye with us:

"He advised scientists not to attribute to themselves authority with which they were not vested. 'I know,' he declared, 'that there are people in this country and on the other side of the Atlantic who have been led, out of a high sense of responsibility and perhaps against their own inclinations, being scientists, to pursue for the time being the role of politician.'"

FIFTEEN YEARS AGO
(From Our Files of August, 1931)

Eastman Co. makes plans to continue the expansion of its Tennessee acetate cellulose operations at the rate of about $2,000,000 per year until practically all of its activities, with the exception of the parent plant at Rochester, N. Y., are located at Kingsport.

Federal Grand Jury hands down indictments against 53 corporations and individuals on charges of conspiracy to divert industrial alcohol into bootleg channels. Such companies as United States Industrial Chemical, American Solvents and Chemical, Roessler & Hasslacher, The Glidden Co., and the American Oil & Supply Co., were named in the account given to the press.

The chemical industry is vitally concerned in the attempt of the railroads to obtain a general increase in freight rates of 15 per cent. The Interstate Commerce Commission is sitting as a judicial tribunal. Most of the fertilizer companies are petitioning for a hearing in opposition.

Du Pont announces purchase of Newport dyes, subject to Newport stockholders' approval.

Lucerne Nitrate Conference, held with the hope of making a new alignment of price schedules, fails after the German Reich placed a prohibitive duty of $28.80 a ton on nitrogen fertilizer.

George Y. Frankle is appointed sales manager of Swann Chemical Co. to succeed Robert S. Weatherly, who has been made vice president.

THIRTY YEARS AGO
(From Our Files of August, 1916)

Agricultural appropriation bill provides funds for research in drugs and chemistry. The Bureau of Chemistry is to undertake a new work—"investigation and experiment in the utilization, for coloring purposes of raw materials grown or produced in the United States."

Caustic soda, chloride of lime and other chlorine products are being manufactured by the Great Western Electro-Chemical Co., Pittsburg, Cal. It is the only plant using the electrolytic process for these products west of Detroit.

TAKE YOUR "BABY" TO THE DOCTOR!

Here is an export package that can give your new product full protection for either domestic or overseas shipment, and at low cost! It's the tear-resistant, puncture-resistant Bemis Waterproof Bag selected for your new "baby" by the Bemis "doctors."

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Finally, they test the bag selected under extremes of shipping and storage conditions. When it receives a final "O.K." by the Bemis Shipping Research Laboratory, you can be sure your "baby" will travel safely.

A useful new book, "7 Facts About Low-Cost Protective Packaging," tells how Bemis Waterproof Bags will serve advantageously as the container for your products, for both domestic and overseas shipments. Mail the coupon today for free copy.

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3. Outside layer of burlap or cotton and cements both layers together.

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PATENTS AND TRADEMARKS

Abstracts of U. S. Chemical Patents

A Complete Checklist Covering Chemical Products and Processes

Printed copies of patents are available from the Patent Office at 10 cents each. Address the Commissioner of Patents, Washington, D. C., for copies and for general information concerning patents or trade-marks.

From Official Gazette—Vol. 585, Nos. 3, 4, 5—Vol. 586, No. 1 (April 16-May 7)—p. 697

* *Specialties*

Making lubricating composition which comprises reacting aromatic hydroxy-ester containing aromatic radicals coupled through sulphur with organic disubstituted phosphorus chloride compound to produce oil-soluble phosphite ester to increase film-rupture strength of lubricating oil base in which it is dispersed. No. 2,396,839. Elliot Evans and John Elliott.

Poison gas protection including intermixing gelatin and hardening agent of high oxidizing powder and in excess over quantity required for hardening gelatin, and forming thin, flexible, protective layer for materials. No. 2,396,923. Majer Mendelsohn.

Treating boiler to remove and prevent scale which comprises introducing into boiler an aqueous composition containing polyalkali metal salt of alkylene polyamine polyacetic acid. No. 2,396,938. Frederick Bersworth to The Martin Dennis Co.

Preparing petroleum distillate solutions of rotenone and rotenone-containing extracts comprising contacting rotenone product with petroleum distillate in presence of solubilizer consisting of secondary-butylphenol. No. 2,396,983. Edgar Britton, Gerald Coleman and Karl Clack to The Dow Chemical Co.

Printing ink comprising pigment and vehicle, vehicle consisting of non-resinous, thermo-setting liquid condensate of phenolic compound from monohydroxy benzene and its carbon alkylated products with formaldehyde, said liquid vehicle maintaining its liquidity and chemical composition on standing at normal temperatures, but resinifying into solid resin when heated. No. 2,397,019. John Kroeger and Harry O'Connor to Fred'k H. Levey Co. Inc.

Composition comprising a protein and highly persistent aqueous dispersion of calcite pigment coated with alkaline earth phosphate material and having concentration of pigment twice as great as concentration of pigment in normal aqueous dispersions, said dispersion having insolution water-soluble pyrophosphate of alkali metal to precipitate all soluble alkaline earth compounds in calcite and for effecting dispersion of coated calcite. No. 2,397,035. Kenneth Mowlds to The Glidden Co.

* *Textiles*

Producing elastic fabric having appearance and feel of non-elastic fabric which comprises forming thin, vulcanized film of rubber, applying unvulcanized rubber latex to one surface of each of pair of textile base fabrics, stretching rubber film, adhesively uniting base fabrics by means of latex to opposite faces of rubber film as latter is held stretched. No. 2,397,838. Marc Chavannes to American Ecla Corp.

Producing artificial filaments, films and like, step of extruding solution of viscose containing dissolved ethylene oxide polymer having molecular weight of at least 6,000 through jet into aqueous precipitating medium such that breakage of filaments and encrustation of jet are inhibited. No. 2,397,338. Hale Cowling to American Viscose Corp.

Finishing textiles which comprises impregnating them with aqueous solution of quaternary ammonium salt of water-insoluble ether of dimethylol urea and then heating to decompose quaternary ammonium salt and cure dimethylol urea ether to a resin. No. 2,397,451. Herbert West to American Cynamid Co.

* *Water, Sewage, and Sanitation*

Making water treating product which comprises humidifying powder particles comprising polyphosphate from alkali metal triphosphates, tetraphosphates and decaphosphates, agitating humidified powder particles to form agglomerates, and screening and drying agglomerates. No. 2,396,918. Findley Hubbard and Campbell McCullough to Monsanto Chemical Co.

Agricultural

Smoking tobacco comprising tobacco impregnated with fluid comprising yeast fermentation of boiled mixture of dried figs and salt, flavored with orange extract. No. 2,399,911. Euripides Constantine.

Handling and processing crude oleo-resin, which comprises transporting plurality of portable containers loaded with material from widely separated production areas to central point, dumping crude material into large fixed receptacle, mechanically stirring crude oleo-resin, and thereafter dipping up batches of accumulated blended mixture carrying same to processing equipment. No. 2,400,040. McGarvey Cline to Wood Process Co. Inc.

Treating cereal grain germ. No. 22,748. Ezra Levin.

Removing skins from potatoes which comprises immersing potatoes in aqueous solution of caustic soda and sodium chloride at temperature in excess of 220° F. No. 2,399,282. Ralph Miller and Osceola Andrews to Pittsburgh Plate Glass Co.

Preparing starch acetate which comprises acetylating starch with mixture of acetic anhydride and acetic acid, in presence of esterification catalyst selected from perchloric acid and sulfuric acid. No. 2,399,455. Robert Treadway to the Secretary of Agriculture of the United States of America.

Non-dusty dry saponified rosin sizing composition readily dispersible in

* *Continued from Vol. 584, Nos. 3, 4, Vol. 585, Nos. 1, 2.*
(Continued on following page)

Patents Available for License or Sale

The Patent Office is regularly publishing a Register of Patents Available for Licensing or Sale. Patents concerning chemical products and processes appear below.

July 2, 1946

Pat. 1,896,379. Sterilizing Apparatus. Patented Feb. 7, 1933. Subjects water, milk, fruit juices or other liquids to the action of ultra-violet rays for sterilization purposes. Spaced quartz tubes extend downwardly into an elongated sterilizing chamber. An insulated cover has a continuous quartz tube (capable of generating sterilizing rays) U formations of which project into the chamber tubes. Liquid is introduced into the chamber through one end near the bottom and circulates past the tubes. Permits a relatively large area of generating tube to be employed, and tubes of different lengths to regulate capacity of the apparatus. (Owner) Eleanor R. Case. Address correspondence to Willy Bruno Vorrath, 5727 Benner St., Los Angeles 42, Calif. Group 36—99. Reg. No. 2,943.

Pat. 1,919,180. Article, Method and Machine for Manufacture. Patented July 18, 1933. Polishing pads which will not scratch or cut surfaces of article being polished are made on machine covered by patent. An abrasive such as jewelers' rouge or chalk is beaten into a large mass of kapok or cotton fiber, heated to a temperature of between 100°–200° C. and compacted and later cut to desired size. (Owner) Bank of America National Trust and Savings Association. Address correspondence to Harry C. Schroeder, Central Bank Bldg., Oakland, Calif. Groups 32—91; 35—59. Reg. No. 2,964.

July 9, 1946

Pat. 1,961,297. Refrigerating System. Patented June 5, 1934. Group 35—84. Reg. No. 2,978.

Pat. 2,187,497. Refrigerator. Patented Jan. 16, 1940. Group 35—84. Reg. No. 2,979.

The two patents listed above relate to refrigerating systems of the absorption type operating under pressure lower than atmospheric in which the expansion and contraction of the refrigerant absorb the heat from the surrounding area. Patent 1,961,297 may use water as a refrigerant and an absorbent such as glycerole, two cycles being maintained for the refrigerant and the absorbent. In Patent 2,187,497 pressure is equalized between the evaporator and the absorber and the generator and the reabsorber by an admixture of a neutral gas (hydrogen) to the refrigerant (ammonia) and the absorbent (water). Also should generator heat be insufficient, the pressure differential existing between the generator and the reabsorber will cause the ammonia to diffuse to maintain flow so as not to impair the efficiency of or stop the operation of the system. (Owner) Abraham Katzow, 615 Madison St., Indianapolis, Ind.

Pat. 2,283,213. Refrigerating System. Patented May 19, 1942. Group 35—84. Reg. No. 2,980.

Pat. 2,350,115. Refrigerating System. Patented May 30, 1944. Group 35—84. Reg. No. 2,981.

The two patents listed above are of the same type as Patents 1,961,297 and 2,187,497 using ammonia as the refrigerant, water as the absorber, and hydrogen as the inert gas. Patent 2,283,213 uses an arrangement of two generators and one or two absorbers. A generator and an absorber are arranged in heat exchanging relationship so that the heat taken up in the generator and emitted in the reabsorber is used to expel the refrigerant from the solution in the associated generator. Patent 2,350,115 uses either one or two condensers with two generators, one condenser being arranged in heat exchanging relationship so that heat absorbed by the refrigerant in the primary generator is given up in the condenser and used to expel the refrigerant from the solution in the associated generator. (Owner) Abraham Katzow, 615 Madison St., Indianapolis, Ind.

Pat. 1,971,241. Method of Chlorination. Patented Aug. 21, 1934. The material being chlorinated (wood pulp, ores, rubber, vegetable oil) is suspended or dissolved in a fluid mixture of water and carbon tetrachloride and constantly churned so that elemental chlorine which is introduced under pressure at several points, may come in close contact with and be absorbed by the stock being treated. Due to the rapidity of the process, the operation may be performed in an open receptacle, the reaction being maintained at a maximum so that harmful reactions such as oxidation are substantially reduced to prevent weakening of the stock. (Owner) Pennsylvania Salt Mfg. Co., Box 4388, Chestnut Hill P. O., Philadelphia 18, Pa. Group 28—89. Reg. No. 2,983.

(Continued on following page)

(Continued from preceding page)

Pat. 1,888,886. **Treatment of Caustic Solutions for the Production of Solutions and of Solid Caustic Soda of a High Degree of Purity.** Patented Nov. 22, 1932. Group 28—89. Reg. No. 2,984.

Pat. 1,944,630. **Process for Purification of Caustic Soda Solution.** Patented Jan. 23, 1934. Group 28—89. Reg. No. 2,985.

Pat. 1,998,471. **Process of Purifying Concentrated Caustic Soda Solutions.** Patented Apr. 23, 1935. Group 28—89. Reg. No. 2,986.

Pat. 2,003,734. **Process of Treating Caustic Soda Solutions.** Patented June 4, 1935. Group 28—89. Reg. No. 2,987.

Pat. 2,028,898. **Process for the Purification of Caustic Soda Solutions.** Patented Jan. 28, 1936. Group 28—89. Reg. No. 2,988.

Pat. 2,040,717. **Process of Purifying Concentrated Caustic Soda Solutions.** Patented May 12, 1936. Group 28—89. Reg. No. 2,989.

The six patents listed above relate to the removal of sodium chloride and sodium sulphate to further purify the caustic soda obtained by the electrolysis of brine. As basically recited in Patent 1,888,886 the addition of sodium sulphate or sulphuric acid at various temperatures either precipitates the sodium chloride or forms a double salt which may be removed by filtration or decantation. Patents 1,944,630; 1,998,471; and 2,028,898 relate to the recovery, for further reuse, of the sodium sulphate used in the process. In Patent 2,003,734 a solution of caustic soda is passed through a filter bed of any of the salts of carbonic acid (i. e., calcium carbonate) to form a removable insoluble salt. Relatively larger crystals are formed which are more readily removable by treating the caustic soda at a temperature of at least 60° C., adding finely divided sodium sulphate and subjecting the solution to rapid cooling. (Owner) Pennsylvania Salt Mfg. Co., Box 4388, Chestnut Hill P. O., Philadelphia 18, Pa.

Pat. 2,076,604. **Cleaning Pad.** Patented Apr. 13, 1937. A fibrous wad of paper, cotton, wool, or the like is impregnated with an abrasive, wax, kerosene, etc., and used for polishing and cleaning metal. Pad may be used several times, being stored in an air-tight bag or container and kept from drying out. May be manufactured at low cost; various modifications for packaging and display being shown. (Owner) Pennsylvania Salt Mfg. Co., Box 4388, Chestnut Hill P. O., Philadelphia 18, Pa. Group 28—93. Reg. No. 2,990.

(Continued from preceding page)

water and resistant to oxidation in air, comprising saponified rosin as dry powder and wax to increase resistance of saponified rosin to oxidation in air and to render it non-dusty. No. 2,398,699. Arthur Dreshfield to Hercules Powder Co.

Cellulose

Preparing cellulose nitrate with viscosity characteristic of between 1.5 seconds and 11.5 seconds from regenerated cellulose in form of small crumpled pieces of thickness of less than .0018 inch, step of nitrating said cellulose with nitrating acid mixture consisting of nitric and sulphuric acids. No. 2,399,620. Lee Blyler to E. I. du Pont de Nemours & Co.

Rapidly building tubular laminated structures from heavy sheet of fibrous cellulosic material of thickness of 10 mils, sheet carrying coating of polyvinyl alcohol on one surface, polyvinyl alcohol being equivalent to product derived from hydrolyzing polyvinyl ester not less than 50%. No. 2,399,338. James Ford to Westinghouse Electric Corp.

Cellulose ether composition characterized by high dielectric strength, low moisture absorption, and high flexibility at low temperatures, comprising ethyl cellulose soluble in alipathic hydrocarbon solvents and plasticizer consisting of branched-chain primary alkyl ester of saturated fatty acid. No. 2,399,602. Lawrence Rauner and Melvin Hunter to The Dow Chemical Co.

Alkamido cellulose ethers and process of making same. No. 2,399,603. John Rust and William Van Delden to Montclair Research Corp.

Producing highly substituted organic solvent-soluble methallyl ethers of cellulose which comprises reacting alkali cellulose with methallyating agent in presence of excess of caustic alkali. No. 2,398,767. William Burke to E. I. du Pont de Nemours & Co.

Ceramics

Forming seal between glass and body of metal chosen from tantalum and zirconium comprising applying molten glass to surface of metal body while surface is in contact with flux comprising fluoride of metal chosen from alkali metals and alkaline earth metals. No. 2,399,770. Raymond Taylor to Bell Telephone Laboratories, Inc.

Making refractory, vitreous, non-porous, lightweight, cellular ceramics, which comprises providing amorphous low temperature-dehydrated ceramic material, finely grinding same, mixing ground material with cell-forming compound, heating at sub-atmospheric pressures. No. 2,399,225. John Allen Heany.

Preparing vitreous enamel and glazes from enamel mass free from suspension agent, step of introducing gas opacifier composition into enamel mass, said composition being gas opacifying substance incorporated in pores of inorganic gel-like substance capable of distributing and subdividing gas opacifying substance in its pores. No. 2,399,232. Ignaz Kreidl and Werner Kreidl.

Preparing enamel slip from enamel frit, clay, water, and gas opacifying substance being incorporated in pores of inorganic gel-like substance. No. 2,399,233. Ignaz Kreidl and Werner Kreidl.

Glass polishing material consisting of alkaline dispersed suspensoid fraction of classified finely pulverized silica, 90% thereof having fineness of minus 5 microns, and cupric sulfate to impart pH of less than 7. No. 2,399,237. William Maloney.

Improving smoothness and gloss of fluorine-containing enamel when fired and matured on article to be coated which comprises, fritting fluorine containing enamel, and then heating coarse fritted enamel, before same is ground to a size used in firing, to a temperature within its annealing range but below temperature at which particles soften and stick togther. No. 2,398,494. Alden Deyrup to E. I. du Pont de Nemours & Co.

Black phosphate glass which comprises P_2O_5 and second group oxide, and which contains cobalt oxide, glass in thickness of one millimeter having transmission at wave length 254 mu and complete absorption of visible light. No. 2,398,530. Joseph Hooley to Corning Glass Works.

Making wire-wound electrical resistors which comprises applying to core wound with resistance wire a coating of slip comprising aqueous suspension of a clay, drying coating, applying coating of vitreous enamel slip over clay coating. No. 2,398,686. Jason Zander to Chicago Vitreous Enamel Product Co.

In enamel coated article, a ferrous base, copper coating on base, layer of nickel-manganese alloy comprising .20% to 5.0% manganese and balance nickel on copper, and coating of vitreous enamel on alloy. No. 2,398,881. Morris Brown and Russel Harr to Western Electric Co. Inc.

Laminated glass structure comprising two sheets of glass and interposed layer of thermoplastic adherent thereto. No. 2,398,886. John Drake and George Watkins to Libbey-Owens-Ford Glass Co.

Apparatus for manufacture of vitrified quartz bodies from sand. No. 2,398,952. Henry Nachod.

Ceramic composition which comprises strontium titanate and alkaline earth stannate. No. 2,399,082. Eugene Wainer to The Titanium Alloy Manufacturing Co.

Enamel coated article comprising iron base, copper plated coating of around 20 milligrams per square inch thereover, layer of nickel-cobalt alloy over the copper plate, and fused enamel coating over nickel-cobalt alloy. No. 2,399,094. Morris Brown and Russel Harr to Western Electric Co. Inc.

Coatings

Coating particles of normally-adhesive material with finely-divided solid dust. No. 2,399,717. Maurice Arveson to Standard Oil Co.

Coating cellulosic fibrous material without changing original physical properties of flexibility and ability to be bent without rupturing, which comprises preparing emulsion of copper naphthenate, alumina naphthenate, paraffin, water and emulsifier, impregnating cellulosic fibrous material, submitting material to pressure to expel water and subjecting to temperature. No. 2,399,873. Edwin Littman and John Klotz to Stanco, Inc.

Coating surface that includes applying suspension comprising volatile liquid vehicle, finely divided cellulosic material, and intermediate reaction products of formaldehyde with urea and substance from diureido alkanes, di-ureidoalkyl esters, di-ureidoalkyl polyesthers, etc. No. 2,400,016. Leonard Meyer to Libbey-Owens-Ford Glass Co.

Preparing film forming composition for use as coating medium, which comprises heating to polymerization in closed container a mixture of unsaturated glyceride oil and diene hydrocarbon consisting of 1 to 5 cyclic C_5H_6 groups per molecule in presence of resin soluble therein. No. 2,399,179. Howard Gerhart to Pittsburgh Plate Glass Co.

Creping of webs with thin coatings of creping adhesive. No. 2,399,256. William Rowe to Cincinnati Industries, Inc.

Coating composition having pH within 4.0 to 7.0 comprising mineral pigment, alkali metal polyphosphate dispersing agent, starch, a member of acid-curing urea-aldehyde and melamine-aldehyde condensation products, and acidic curing catalyst. No. 2,399,489. Chester Landes to American Cyanamid Co.

Apparatus for coating finely divided particles with metal comprising chamber, means for evacuating air and generating metal vapor in chamber, and means within vessel for holding and sifting finely divided solid material to cause it to fall through vapor. No. 2,398,517. Wilbur Castor.

Applying metal coating to metal base having surface composed of light metal selected from aluminum and magnesium comprising contacting base with fused salt bath comprising copper, lead, or silver halides, and thereafter removing residual metal halide by immersion in fused bath comprising solution of alkali metal hydride in alkali metal hydroxide. No. 2,398,738. Harvey Gilbert to E. I. du Pont de Nemours & Co.

Dyestuffs

Azo dyestuffs of the pyrazolone series. No. 2,399,447. Eduard Moser to Society of Chemical Industry in Basle.

Chromable dyestuffs and process of making same. No. 2,398,358. Achille Conzetti and Guido Schetty to J. R. Geigy A. G.

Azo-dyestuffs. No. 2,398,367. Friedrich Felix and Alphonse Heckendorn to Society of Chemical Industry in Basle.

Anthraquinone dye mixture obtained by oxidation of product obtained by condensing hydroxyalkylamine from beta-hydroxyethylamine, beta-hyroxypropylamine, etc., and alkoxyalkylamine from beta-methoxyethylamine, betaethoxyethylamine, etc., with compound from leucoquinizarin and mixture of quinizarin and leucoquinizarin. No. 2,398,454. Edmund Towne, Joseph Dickey and John Byers, Jr., to Eastman Kodak Co.

Cyanine dyes represented by general formula described in patent. No. 2,398,999. Leslie Brooker and Homer Cressman to Eastman Kodak Co.

Water-soluble disazo dyestuffs and process for their manufacture. No. 2,399,064. Guido Schetty to J. R. Geigy A. G.

Heterocyclic stilbene azo dyestuffs. No. 2,399,066. Max Schmid and Eduard Moser to Society of Chemical Industry in Basle.

Equipment

Longitudinal slipper die for extruding organic plastics. No. 2,399,615. James Bailey and Herbert Pratt to Plax Corp.

Apparatus for washing films contained on reels comprising tank, table mounted for totation therein about axis disposed centrally thereof, means formed on table for supporting any one of plurality of reels of different diameters and widths co-axially, etc. No. 2,399,617. Roy Ballantyne.

Air heating furnace. No. 2,399,690. Arthur Olson.

In mash and wort separator, a hollow cylindrically shaped drum, with all over distributed openings, forming interior compartment, stationary cylindrically shaped wall, with all over distributed openings, etc. No. 2,399,710. Robert Schock to Schock, Gusmer & Co. Inc.

In nozzle for intimately mixing and ejecting colloidal solutions which

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set to form inorganic oxide hydrogels, combination of elliptical rubber tube, elliptical metal tube about and co-axial with rubber tube, means to rotate metal tube about rubber tube and to feed fluids to be mixed. No. 2,399,712. Elbert Sowerwine, Jr. to Socony-Vacuum Oil Co. Inc.

Catalyst chamber having fluid inlet, fluid outlet, opening in wall of chamber, and plurality of hollow partitions disposed in vertical spaced relation across interior of chamber thereby dividing same into compartments each containing solid catalyst material, etc. No. 2,399,827. Wendell Roach and David Blaker to Phillips Petroleum Co.

Measuring gas interchangeability in device of Bunsen burner type, which comprises normally subjecting heat conducting thermometric probe to temperature of primary air-gas flow immediately ahead of primary combustion zone as measure of height of inner cone of flame, etc. No. 2,399,830. Edwin Schmidt to Cutler-Hammer, Inc.

Hydraulic accumulator for storing fluid under pressure which comprises container, inflatable spherical bag inside container which is secured in opening in wall of container, a port for fluid in opposite portion of container to that to which bag is secured, said container being pear shaped. No. 2,399,879. Jean Mercier.

Apparatus for removing slag from furnaces. No. 2,399,884. Walter Noack to Aktiengesellschaft Brown, Boveri & Cie.

In a filter, a header, a pipe carrying header, header comprising chamber having continuous wall provided with plurality of perforations, etc. No. 2,399,887. George Olson.

Heating system of circulating liquid class. No. 2,399,941. Marc Resek to Perfection Stove Co.

Gas generator comprising reaction chamber, a stratum of electrically conducting, loosely contacting pellets therein, fixedly spaced cooperating electrodes electrically contacting with stratum of pellets, means for enveloping pellets in liquid to be gasified, etc. No. 2,399,951. Chauncey Suits to General Electric Co.

Apparatus for making carbon black by impingement process which includes shed having outlets for gaseous products at top thereof and small air inlets adjacent bottom thereof controlling air entering shed, etc. No. 2,399,969. Ira Williams and Frank Selfridge to J. M. Huber Corp.

In fluid strainer, a casing, screen dividing casing into fluid receiving and discharge chambers, fluid inlet pipe connected with receiving chamber, etc. No. 2,399,994. Robert Feagin.

Fractionating column for analytical distillation apparatus. No. 2,400,021. Walter Podbielniak to Benjamin Schneider.

Sublimation apparatus comprising retort part and condenser part. No. 2,399,180. Murray Girvin and Leo Dentone to The Permanente Metals Corp.

Dehydrating apparatus comprising chamber, drum rotatable in chamber on horizontal axis and having end walls so that batch of material to be dehydrated can be contained in bottom portion of drum and film of material will be carried on inner surfaces above batch when drum is rotated, etc. No. 2,399,247. Walter Patrick, Jr. and John Elder; said Elder to Crown Cork & Seal Co. Inc.

Apparatus for continuously electroplating moving strip of material having conductive face comprising horizontally disposed electroplating cell having electrolyte therein. No. 2,399,254. Ernest Rieger and Clarence Klein to National Steel Corp.

In apparatus for fractional distillation, a distilling column and means for applying heat to lower portion thereof, means for supplying cooling medium in heat exchange relationship with upper portion of column, means responsive to degree of pressure change in outlet line controlling amount of cooling medium supplied. No. 2,399,334. Donald Douslin and Charles Weinaug to Phillips Petroleum Co.

Apparatus for determining mold cavity pressure. No. 2,399,342. Edward Gibbons and Thomas O'Neil, Jr. to American Cyanamid Co.

In dialyzer, means defining plurality of groups of liquid cells, each two adjacent cells of each group having common membranous dividing wall, and means for passing liquid to be dialzyed through alternate cells, and recovery liquid through intermediate cells, etc. No. 2,399,471. Frederick Daniel and Joseph Hutchings; said Daniel to Hornkem Cap; said Hutchings to Brosites Machine Co.

Dehydrating apparatus comprising means for containing liquid to be dehydrated, having heat conductive wall, body of desiccant maintained against outside wall, and suction line for drawing vapors from liquid into contact with desiccant. No. 2,399,504. Walter Patrick, Jr.

Apparatus for separating suspended material from stream of gas at high pressure. No. 2,399,509. Paul Rich to Western Precipitation Corp.

Reactor for production of olefins and diolefins. No. 2,399,560. Eger Murphree to Standard Oil Development Co.

Producing carbon black by impingement process employing burner supplying flame of burning gaseous fuel, solid flat metallic carbon collecting surface, and shed enclosing burner and solid surface and supplying air to flame, improvement which comprises directing all of air supply for flame from outside of and below burner up to flame in direction parallel to direction of flame, etc. No. 2,399,591. Fred Amon to Godfrey L. Cabot, Inc.

High temperature recuperating furnace capable of generating temperatures in excess of 1800° C. No. 2,399,609. Eugene Wainer to The Titanium Alloy Manufacturing Co.

Scrubbing apparatus wherein gas is scrubbed by liquid comprising in combination a tower, plurality of receptacles arranged in superposed tiers in tower, and adapted to hold pool of liquid into which gas is forced by liquid falling into pool, etc. No. 2,398,345. Charles Cooper to E. I. du Pont de Nemours & Co.

Liquid level indicator for use with liquid carrying tank including, vertically arranged tubular body, diaphragms closing ends of body, column of mercury, etc. No. 2,398,375. Daniel Heenan to F. H. Breen.

Apparatus for treatment of liquid hydrocarbons comprising paraffin-base crude oil residuum to produce synthetic ceresin by separating high melting point amorphous wax contained in residuum into shreds, com-

prising agitator for preliminary cleaning of oil, a mixing tank, etc. No. 2,398,424. Adolph Grunspan, now by judicial change of name Adolphus Garvin.

Retort for treating comminuted carboniferous materials, comprising plurality of vertically stacked and horizontally disposed conveyor courses discharging comminuted carboniferous materials successively downwardly, vapor dome arranged over each conveyor course, etc. No. 2,398,446. Herbert Phillipson.

Light polarizer comprising supporting plate, and thin dichroic layer of linear, hydrophilic, high polymeric plastic material having its molecules oriented, said layer comprising plurality of superimposed dichroic films bonded together and separately formed in situ upon supporting plate. No. 2,398,506. Howard Rogers to Polaroid Corp.

Apparatus for thermal treatment of fluids which comprises vessel having outer metallic shell forming enclosed chamber, lining for chamber composed of solid refractory material and spaced from said shell, etc. No. 2,398,546. Harold Messmore to Phillips Petroleum Co.

Manufacture of glass pipettes of clinical type, which comprises forming closed chamber of selected volume between opposed capillary tubular stems having capillary ports communicating with chamber, heating and forming to projecting tip a single selected area of mixing chamber wall spaced from capillary ports, etc. No. 2,398,737. Robert Elliot and Edward Lavor.

Pulverizing apparatus having drum adapted to contain material to be pulverized, etc. No. 2,398,774. Ludlow Beach to Foster Wheeler Corp.

Electrostatic sizing of materials. No. 2,398,792. Herbert Johnson to Ritter Products Corp.

Fractional distillation apparatus, comprising single vertical tubular column having distilling chamber and enclosing fractionating surfaces. No. 2,398,807. Warner Scovill and Thomas Walsh to The Standard Oil Co.

Fractionating column for separating gases comprising elongated chamber, shaped to provide contiguous sectional chambers of reducing cross-sectional areas from one end to other. No. 2,398,818. Nelson Turner.

Device for purifying oxygen and like having cartridge-receiving tank provided with fluid inlet and fluid outlet, cartridge containing purifying material positioned in tank, and cartridge-penetrating means for puncturing end of cartridge, etc. No. 2,398,830. James Hamilton to Air Reduction Co. Inc.

Apparatus for producing continuous compacted batting of continuous crinkled filaments of organic solvent-soluble, thermoplastic organic filament-forming material. No. 2,398,831. Robert Hoffman to E. I. du Pont de Nemours & Co.

Distillation apparatus which includes central vertically extending evaporation heater, condenser spacedly surrounding heater, and passages for introducing raw cool liquid to condenser, etc. No. 2,398,836. Henry Lea; Grace Lea administratrix of said Henry Lea, deceased.

Device for detecting gamma radiation comprising cylindrical cathode member, anode member formed by wire passing axially through cylindrical member, and plurality of separated plates extending laterally and externally of cylindrical member. No. 2,398,934. Donald Hare to The Texas Co.

Bubble tower unit. No. 2,398,953. James O'Brien.

Process and apparatus for promoting thermal reactions which comprises passing continuous column of solids downwardly through reaction zone, introducing heating gases at expanded intermediate heating zone in said column, passing said heating gases upwardly, etc. No. 2,398,954. William Odell to Lion Oil Co.

Apparatus for determining level of granular material in bin comprising source of gas under pressure, tube arranged for vertical reciprocation in bin, communicating means including orifice restriction for delivering gas under pressure from source to tube, etc. No. 2,398,958. Joseph Pellettere to Gulf Oil Corp.

Centrifugal filter apparatus for separating mixture of liquid and lighter solid, comprising rotatable drum open at one end to receive mixture of liquid and solid materials and having opposite end wall to retain mixture within drum, the circumferential wall of drum being imperforate, etc. No. 2,398,967. August Henry Schutte.

Apparatus for continuously predicting a trend in observed data comprising, a graphing device including casing having coordinate axis chart face; indicating members equally spaced along abscissa axis and movable parallel with ordinate axis having heads exposed on chart face, etc. No. 2,398,987. Herbert Ziebolz to Askania Regulator Co.

Apparatus for supervising manufacturing operation designed for production of uniform product required to have characteristic fall within specified limits comprising mechanical graphing device having plurality of indicators uniformly spaced along axis representing one of axes of coordinate axis graph, etc. No. 2,398,988. Herbert Ziebolz to Askania Regulator Co.

Air swept ball mill system. No. 2,398,989. Frederick Agthe to Allis-Chalmers Manufacturing Co.

Electrical indicator for pulverulent-material storage bins including electric motor, support therefor, indicator arm, means for rotating arm from electric motor, etc. No. 2,399,015. Joseph Gaffney to Fuller Co.

Dispensing device for finely divided material, a container bowl for supply of material having orifice to discharge material, valve in bowl adjacent orifice, said valve comprising plurality of rotating and non-rotating superimposed disks, etc. No. 2,399,016. Joseph Gits to West Disinfecting Co.

Apparatus for catalytic reactions including regeneration vessel at higher level than reaction vessel, etc. No. 2,399,050. Homer Martin to Standard Oil Development Co.

Rotating air swept ball mill having discharge end, transverse discharge screen spaced from discharge end thereof, etc. No. 2,399,051. Walter Maxson, John Fagnant and Edward Baxa to Allis-Chalmers Manufacturing Co.

Device for spraying liquids, a straight elongated air tube, container for liquid having its upper end secured to tube adjacent to one end of tube, etc. No. 2,399,081. Edwin Vose to Spray Process Co. Inc.

Leak-proof dry-cell provided with circuit terminals at opposite ends, comprising hollow cylindrical zinc electrode containing electrolyte; centrally disposed carbon electrode and depolarizing mix in electrolyte; sheath of thin flexible rubbery material, resistant to penetration by electrolyte, etc. No. 2,399,089. Herman Anthony to Ray-O-Vac Co.

Dry cell of Le Clanche type having zinc anode, carbon cathode, depolarizing mixture and aqueous electrolyte comprising ammonium chloride and containing in solution zinc oxide and compound from chromic acid, dichromic acid and their water coluble salts. No. 2,399,127. Vincent Lipinski to Burgess Battery Co.

Food

Powdered cream in which particles have dispersed therein added lecithin. No. 2,399,565. Gerald North and Alvin Alton to Beatrice Creamery Co.

Removing astringent meters from cocoa which comprises roasting cocoa beans, grinding them and subjecting cocoa liquid to heating and aeration treatment. No. 2,398,945. George Lawton.

Frozen-confection-mix containing as addition agent, an ester of inner ether of a hexahydric sugar alcohol, and a saturated higher fatty acid. No. 2,398,950. Harold Moore.

Inorganic

Preparing silica which comprises admixing gaseous ethyl silicate with combustible gas, burning mixture, and collecting solid silicon dioxide from vapors. No. 2,399,687. Frederick McNabb to The B. F. Goodrich Co.

Ammonium nitrate composition having improved resistance to caking comprising granular ammonium nitrate coated with mixture of natural resin, paraffin, and petrolatum, with porous, low-density, water-insoluble inorganic material. No. 2,399,987. Cornell Cordie and Robert Lawrence to Hercules Powder Co.

Imparting high compression strength to catalyst containing alumina and compound of metal of VI group of periodic system which comprises heating catalyst after its original compression strength has been reduced to between 500° F. and 1200° F. No. 2,400,025. Walter Scharmann to Standard Oil Development Co.

Producing beryllium oxide from finely divided beryl. No. 2,399,178. Maxime Furlaud.

Dehydrating transformer oil, which comprises passing transformer oil through body of finely divided metal hydride. No. 2,399,192. Peter Alexander to Metal Hydrides Inc.

Applying stable, water insoluble, evaporated inorganic salt on hot optical surface by molecular deposition under vacuum to form hard, durable, and tenacious coating layer, maintaining optical surface in vacuum. No. 2,398,382. Dean Lyon.

Making $MgCl_2$ and magnesium from serpentine. No. 2,398,493. Charles Butt, Alvin Hallman, Clinton Bowden, Eugene Whitlow and Pauline Pace to International Minerals & Chemical Corp.

Preparing aluminum chloride catalyst in shaped body. No. 2,398,557. George Reading to Phillips Petroleum Co.

Preparation of stabilized alumina for use in catalysis which comprises precipitating aluminum hydroxide from aqueous solution of alkali metal aluminate by acid sulfate at pH below 9.8, incorporating alkali metal silicate and removing alkali metal sulfate. No. 2,398,610. William Bailey, Jr. and Clarence Bittner to Shell Development Co.

Treating sea water to recover magnesium salts therefrom as pure magnesium chloride. No. 2,398,743. Sheldon Heath and Forest Minger to The Dow Chemical Co.

Acid treated adsorbent clay of titratable acidity of about 20 or less milligrams KOH per gram of clay containing reserve alkalinity. No. 2,398,825. Stanard Funsten to Filtrol Corp.

Recovery of chlorine from magnesium chloride electrolysis. No. 2,398,891. Arlie Julien and James Farrell to The Solvay Process Co.

Catalytic mass selectively promoting amination of olefins in presence of ammonia comprising metal of class of cobalt and nickel in suspension on carrier of acid-treated bentonite. No. 2,398,899. John Teter to Sinclair Refining Co.

Recovering sulphur dioxide from mixture of gases containing same comprising absorbing sulphur dioxide from mixture with organic-base absorbent, stripping absorbent of sulphur dioxide by heating, etc. No. 2,399,013. Edward Fleming and T. Cleon Fitt to American Smelting & Refining Co.

Forming stable freely flowing particles of red phosphorus which comprises coating particles with thin film of lyophilic protein colloid dispersed in liquid medium, and thereafter removing liquid medium by drying. No. 2,399,120. Loren Hurd to Rohm & Haas Co.

Medicinal

Therapeutic product comprising water-insoluble combination of tannic acid and water-soluble solid extract of posterior lobe of pituitary gland, said extract being of class of extracts containing pressor principle, free from oxytocic principle and extract containing oxytocic principle free from pressor principle. No. 2,399,742. Edward Jones and Oliver Kamm to Parke, Davis & Co.

Increasing germicidal property of solution of one of mercuric chloride and stannic chloride, that comprises adding to each gram colecular weight of such metallic compound an equivalent weight of reducing agent from ferrous sulphate, ferrous chloride, stannous chloride, manganous chloride and manganous sulfate. No. 2,399,829. Anthony Salle and Howard Guest, one-half to Leo Gunther.

Recovery of penicillin from aqueous fermentation liquor comprising adsorbing penicillin from neutralized and filtered fermentation liquor onto activated carbon, separating carbon from penicillin-free fermentation liquor, and eluting penicillin from carbon with aqueous solution of organic aliphatic ester having substantial concentration of water. No. 2,399,840. Jacques Wachtel to the Secretary of Agriculture of the United States of America.

Racemic estrogenic compounds. No. 2,400,034. Ralph Tallman and Alfred Stuart to Schieffelin & Co.

Disinfecting for control of bacteria, microbes, and fungi, comprising contacting organism with disinfectant comprising derivative of dithiocarbamic acid. No. 22,750. Wendell Tisdale and Ira Williams to E. I. du Pont de Nemours & Co.

Synthesis of vitamin B_6. No. 2,399,347. Stanton Harris to Merck & Co. Inc.

Producing aldehyde-killed virus vaccines in desiccated form which includes adding to vaccine, prior to desiccation, a non-toxic aldehyde-reactive reagent which does not destroy virus antigens. No. 2.399,443. Peter Masucci to Sharp & Dohme, Inc.

Product having anthelminthic properties comprising treating solution of oil of rose geranium and hexane with calcium chloride, etc. No. 2,399,597. William Jones and Howard Jones to the Secretary of Agriculture of the United States of America.

Riboflavin derivatives and process of preparing same. No. 2,398,706. Gerhard Haas to Hoffmann-La Roche, Inc.

Antiseptic ice, comprising salt of benzoic acid mixed with chloramine T. No. 398,781. Lawrence Frandsen to National Antiseptics, Inc.

Metallurgy, Ores

Pumping magnesium collected in layer over molten salt bath which comprises providing two connected upright columns of fused salts, one column in which fused salts flow downward, and other in which fused salts flow upward and are discharged, blowing air into column of salt in which material flows upward, etc. No. 2,399,634. William Holland, Charles Berry and Walter McClintock to Reconstruction Finance Corp.

U. S. Chemical Patents

From Official Gazette—Vol. 585, Nos. 3, 4, 5—Vol. 586, No. 1 (April 16-May 7)—p. 701

Increasing specular reflectivity of metal flakes, which comprises ball-milling metal particles in liquid made up of thinner and leafing agent, whereby particles are brought to flake form and furnished with leafing film, discharging mixture of metal and liquid from mill, and subjecting mass to mechanical working involving lamellar flow and surface friction of flake on flake. No. 2,399,705. Othon Ziehl to Metals Disintegrating Co. Inc.

Producing alloyed cast iron rolls having hard martensitic body and machinable necks of same composition as body. No. 2,399,730. Albert Gagnebin and Edmund Wise to The International Nickel Co. Inc.

Incorporating small amounts of boron into molten metal, which comprises adding to molten metal a boron-containing **molybdenum silicide** complex containing approximately 60% molybdenum, 30% silicon, 1.5% boron, and impurities. No. 2,399,747. Arthur Linz to Climax Molybdenum Co.

Making solid oxide-coated copper disk consisting in placing copper powder in mold and compacting same, placing mixture of copper powder and cupric oxide powder in mold on top of first layer, compacting mixture, and then heating mold contents under non-oxidizing conditions. No. 2,399,773. Sidney Waintrob.

Concentrating sulfide minerals of cobalt and nickel by froth flotation from ore in which they are associated with iron sulfide minerals, which comprises conditioning pulp containing cobalt-nickel sulfides with selective collector and with selective depressant mixture comprising compound selected from alkali ferricyanides and alkali ferrocyanides and oxidizing agent selected from alkali permanganates and dichromates. No. 2,399,845. Charles Allen and Dan Kentro to American Cyanamid Co.

Introduction of chromium into steel articles. No. 2,399,848. Gottfried Becker, Karl Daeves and Fritz Steinberg.

Coating and polishing sheet of ferrous metal with zinc by electrodeposition in continuously progressing operation, which comprises subjecting sheet as anode to action of electric current in presence of electrolyte to clean sheet, then subjecting sheet as cathode to electric current in cell containing electrolyte consisting of zinc sulphate and sulphuric acid, etc. No. 2,399,964. Clemson Ward to Bethlehem Steel Co.

Method and apparatus for gaseous reduction of iron oxide in suspension. No. 2,399,984. Lyle Caldwell.

Industrial production of aluminum from starting aluminum compound comprising its oxide in finely divided condition, carried out by sequence of hot treatments comprising converting starting compound into one of oxygen-free compounds of group consisting of carbide, nitride and sulfide, by highly heating same in presence of carbon, nitrogen or sulfur agents, and by high-temperature treatment causing reduction of intermediate compound directly to yield aluminum. No. 2,400,000. Daniel Gardner to Gardner Thermal Corp.

Electric contact combination wherein positive contact is formed of gold base alloy containing indium and negative contact is formed of material from pure silver and silver alloys. No. 2,400,003. Franz Hensel, Kenneth Emmert, and James Wiggs to P. R. Mallory & Co., Inc.

Electrodepositing tin which comprises electrolyzing aqueous acidic tin plating solution of tin aryl-sulphonate in presence of sulphoxide addition agent which is designated by formula OH—R—SO—R'—OH where R and R' represent ring selected from benzene and naphthalene. No. 2,399,194. John Andrews to Carnegie-Illinois Steel Corp.

Cleaning metal parts for removing buffing or drawing compounds, comprising immersing parts into cleaning bath having grease solvent layer and underlying body of grease solvent emulsion, etc. No 2,399,205. Charles Campbell, thirty-five per cent to Blanche Campbell, five per cent to Rita Fossee, five per cent to Jean Ballew, and five per cent to Charles Campbell, Jr.

Removing buffing compounds from metal parts containing zinc in preparation for electroplating parts which comprises dipping parts into grease solvent and thereafter spraying parts with mechanically combined unstable mixture of emulsion of grease solvent and water and unemulsified excess of said solvent. No. 2,399,267. Boleslaus Szatyn to Solventol Chemical Products, Inc.

Selectively carburizing steel article in molten bath of salts containing sodium cyanide which consists in coating portion of article to be carburized with liquid vehicle adapted to dry into adherent film that will burn off at carburizing temperatures in which vehicle is suspended mixture of powdered metal from tin, lead and aluminum, powdered copper, etc. No. 2,399,551. Paul Kramer to Park Chemical Co.

Treating alunite and similar ores containing iron, titanium and silica impurities, to recover valuable constituents. No. 2,398,425. Robert Haff to Elnathan Steinman.

Manufacturing metals of right hand side of group 2 of periodic table whose oxides, hydroxides and carbonates are reducible by carbon. No. 2,398,443. John Munday to Standard Oil Development Co.

Making bimetallic ingot having core of one metal and cladding layer of another, including immersing core in solution of phosphoric acid and metallic salt until layer of double phosphate has been formed, heating core, and pouring cladding metal around core. No. 2,398,529. Carl Holmquist to Copperweld Steel Co.

Making manganese comprising electrolyzing between anode and metal cathode there beneath in a cell a fused bath composed of substance containing fluorine combined with aluminum and metal from potassium, sodium and calcium, maintaining dissolved therein oxide of reagent metal from aluminum and magnesium, etc. No. 2,398,589. Thomas Mitchell to Molybdenum Corp. of America.

Fused bath electrolytic cell for deposition of metal comprising support mounted for vertical movement and for rotation about vertical axis, cell bottom and side wall carried on support which form fluid tight cell, etc. No. 2,398,590. Thomas Mitchell to Molybdenum Corp. of America.

Making chromium comprising electrolyzing in a cell between anode and metal cathode therebeneath a fused bath comprising oxide of reagent metal from aluminum and magnesium dissolved in solvent composed of substance containing fluorine combined with aluminum and potassium, sodium and calcium. No. 2,398,591. Thomas Mitchell to Molybdenum Corp. of America.

Producing manganese, which comprises electrodepositing manganese from aqueous solution containing manganese sulphate, solution also containing ammonium salt of ammonium sulphate and ammonium chloride. No. 2,398,614. Wilber Bradt and Harold Oaks to Vanadium Corp. of America.

Precipitation hardened alloy subject to stress at elevated temperatures, containing carbon, manganese, silicon, tungsten, titanium, molybdenum, cobalt, nickel and iron. No. 2,398,678. Rudolf Thielemann to General Electric Co.

Iron alloy comprising chromium, molybdenum, carbon, and nickel and iron and characterized by being austenitic and free from delta iron when quenched from 2150° F., and by high creep and rupture strengths at 1300° F. No. 2,398,702. Martin Fleischmann to The Timken Roller Bearing Co.

Producing article of aluminum having coating of noble metal thereon which comprises anodizing surface of article, coating article with organic compound of salt of noble metal, and then heating to decompose compound. No. 2,398,712. William Malcolmson and Robert Miner to Western Electric Co. Inc.

Case hardening exterior surface of metallic member having opening therein, which consists in sealing opening by glaze-coated ceramic means, carburizing member, and quenching carburized member while hot, whereby ceramic seal is automatically broken. No. 2,398,809. Christopher Snyder to Steatite Research Corp.

Improving permanent magnet properties of alloy containing 2 to 8% aluminum, 5 to 15% manganese with remainder all silver. No. 2,399,031. Goodwin Howe to General Electric Co.

Making permanent magnet alloys consisting of silver manganese, and aluminum. No. 2,399,032. Goodwin Howe to General Electric Co.

Preparing magnesium-containing mixture which comprises dispersing magnesium compound in liquefiable, thermoplastic carbonaceous material containing no non-coking solid carbonaceous material, and heating to destructively distill carbonaceous material whereby there is produced continuous carbon phase having magnesium compound dispersed therethrough. No. 2,399,096. Alva Byrns to The Permanente Metals Corp.

Producing castings of aluminum-beryllium alloys. No. 2,399,104. Hugh Cooper to Cooper-Wilford Beryllium, Ltd.

Removing oxide coating from aluminum surfaces, comprising subjecting surfaces to action of solution containing water and hydrogen fluoride, balance of solution being compound selected from dioxan and monohydric alcohols, polyhydric alcohols, and ethers containing hydroxyl group derived from polyhydric alcohols. No. 2,399,134. Mike Miller and Wayne White to Aluminum Co. of America.

Organic

Methyl ethenyloxyacetate. No. 2,399,625. Donald Coffman to E. I. du Pont de Nemours & Co.

Purifying crude trichloroacetyl chloride containing perchloroethylene as impurity which comprises passing current of gas consisting of dry chlorine into crude trichloroacetyl chloride, and irradiating same with actinic radiation, etc. No. 2,399,641. Frederick Kirkbride to Imperial Chemical Industries Ltd.

In alkylating aromatic compounds, reacting ethylene with benzene by large amount of vapor phase hydrogen fluoride promoted by smaller amount of boron fluoride, and feeding in cool benzene countercurrently to off-gas of reaction to recover part of fluorides therefrom. No. 2,399,662. Robert Burk and Everett Hughes to The Standard Oil Co.

Dehydrogenating hydrocarbon containing aliphatic chain of less than 5 carbon atoms which comprises subjecting hydrocarbon to contact with dehydrogenation catalyst of type which contains polyvalent multivalent heavy metal oxide carried by surface active refractory metal oxide support, said catalyst having been preconditioned by contact with steam. No. 2,399,678. Eugene Houdry and Hubert Shabaker to Houdry Process Corp.

Preparation of methylolated nitroparaffin derivatives in solution in liquid aliphatic polyhydric alcohol which comprises conducting condensation reaction between nitro-paraffin and formaldehyde in medium comprising aliphatic polydric alcohol. No. 2,399,686. Andrew McLean to Imperial Chemical Industries Ltd.

Producing drying oil which comprises chlorinating soy bean oil by action of nascent chlorine and then subjecting reaction product to action of nascent oxygen. No. 2,399,697. Fred Stark and George Slack to Fred Stark, George Slack, R. Rutledge and Harry Hirst, as trustees.

Preparing polycyclic aromatic alcohol comprising mixing haloalkyl substituted polycyclic aromatic compound with hydrolyzing agent selected from water and dilute alkaline aqueous solution, heating mixture and recovering resulting polycyclic aromatic alcohol. No. 2,399,716. Chester Adams to Standard Oil Co.

Member selected from gamma-dialkylamino-n-propyl benzilates and water-soluble salts thereof, alkyl groups being identical and each being straight chain containing two to four carbon atoms. No. 2,399,736. Roger Holms and Arthur Hill to American Cyanamid Co.

Catalytic process for converting terpenes to p-cymene. No. 2,399,739. Washington Hull to American Cyanamid Co.

Conversion of dicyclic dihydroterpenes to cyclopentene hydrocarbons and pentamethylene hydrocarbons. No. 2,399,741. Vladimir Ipatieff and Herman Pines to Universal Oil Products Co.

Producing aromatics. No. 2,399,751. William Mattox to Universal Oil Products Co.

Manufacture of toluene. No. 2,399,780. George Arnold to The Texas Co.

Manufacture of toluene. No. 2,399,781. George Arnold to The Texas Co.

Recovering aliphatic conjugated diolefin from a monosulfone thereof. No. 2,399,837. John Upham to Phillips Petroleum Co.

Manufacturing barium tert. octyl phenol sulfide of low water-sensitivity when tested in mineral lubricating oil solution, which comprises dissolving tert. octyl phenol sulfide in mineral lubricating oil base stock, heating resulting solution to neutralizing temperature, gradually adding barium hydroxide, etc. No. 2,399,877. John McNab and Dilworth Rogers to Standard Oil Development Co.

Metal derivatives of alkyl phenols. No. 2,399,878. Carll Van Gilder and Helmuth Schneider to Standard Oil Development Co.

Separation of olefin from mixture of hydrocarbons containing acetylenes using cuprous salt solution as adsorption medium. No. 2,399,882. Charles Morrell, James Small and James McAteer to Standard Oil Development Co.

Condensing metal salt of fatty acid having 8 to 22 carbon atoms and aliphatic halide free of sulfonate groups wherein ester and a neutral salt are formed, improvement which comprises conducting condensation in presence of amide which does not enter into reaction but partially dissolves reactants. No. 2,399,959. Nathaniel Tucker to The Procter & Gamble Co.

Determining quantity of hydrocarbons in gas mixtures by catalytic filament resistance comparison, which consists in heating such filament to high temperature and passing hydrocarbon laden gas mixture over filament, whereby hydrocarbons are burned and simultaneously measuring electrical resistance of filament, and passing gaseous products of combustion and residual unburned gases over filament and again measuring filament resistance. No. 2,399,965. Reinhold Weber.

Manufacture of substituted derivatives of 3-ketotetrahydrothiophene. No. 2,399,974. Anthony Avison, Franz Bergel and John Haworth to Roche Products Ltd.

Producing an isophorone which comprises introducing saturated ketone of 3 to 5 carbon atoms into reaction zone and contacting ketone with dilute aqueous solution containing alkali metal hydroxide, etc. No. 2,399,976. Seaver Ballard and Vernon Haury to Shell Development Co.

Producing para-cymene which comprises passing monocyclic terpene over catalyst containing palladium supported on activated carbon, etc. No. 2,400,012. Edwin Littmann to Hercules Powder Co.

Synthesizing hydrocarbon substituted piperazine. No. 2,400,022. Cash Pollard and Leland Kitchen to Board of Commissioners of State Institutions.

Alpha, gamma-di hydroxyphenyl) propanes in which propane carbon atoms is substituted by alkyl group. No. 2,400,033. Ralph Tallman and Alfred Stuart to Schieffelin & Co.

Esters of secondary phenolic amines. No. 2,400,038. Johannes Buck and Laszlo Reiner to Burroughs Wellcome & Co. (U.S.A.) Inc.

Hydroxymethyl tertiary butyl peroxide. No. 2,400,041. Frank Dickey to Shell Development Co.

2-methyl-3-carbethoxy-4-phenoxymethyl-5-cyano-6-hydroxy pyridine. No. 2,400,045. Max Hoffer to Hoffmann-La Roche Inc.

Tetrahydrofurfuryl ether of amino-diphenylamine. No. 2,400,050. Robert Parker and Corris Hoffman to American Cyanamid Co.

Alcoholysis of fatty glycerides. No. 22,751. Walter Trent to Colgate-Palmolive-Peet Co.

Production of unsaturated hydrocarbons by dehydration of polyhydroxy compound comprising subjecting polyhydroxy compound in vapor form while in admixture with unsaturated hydrocarbon to dehydration temperatures in presence of dehydrating catalyst. No. 2,399,164. Joseph Bludworth to Celanese Corp. of America.

Compound having structure described in patent. No. 2,399,285. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Unsaturated esters and polymers thereof. No. 2,399,286. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Unsaturated esters and polymers thereof. No. 2,399,287. Irving Muskat and Franklin Strain to Pittsburgh Plate Glass Co.

Distillation of heat polymerizable aromatic olefin, which comprises distilling in presence of oxygen and polymerization inhibitor selected from inhibitors containing phenol group, quinone group, or amine group. No. 2,399,340. Raymond Franz to The United Gas Improvement Co.

2-Aroyl-3-carboxy norcamphanes. No. 2,399,344. Henry Goodman, Jr. to Carbide & Carbon Chemicals Corp.

Esters of ortho aroyl substituted endomethylene hexahydrophthalic acids, containing up to 10 carbon atoms in ester radical. No. 2,399,345. Henry Goodman, Jr. to Carbide & Carbon Chemicals Corp.

Production of fumarodinitrile which comprises heating mixture of di-iodoethylene and cuprous cyanide in presence of catalyst comprising tertiary amine. No. 2,399,349. Carroll Hochwalt to Monsanto Chemical Co.

1,4-di-(alkylamino)-5,8-naphthoquinone in which alkyl groups contain from 1 to 5 carbon atoms. No. 2,399,355. David Klein to E. I. du Pont de Nemours & Co.

Production of cyanogen which comprises reacting chlorine with hydrogen cyanide in presence of catalyst comprising surface active material. No. 2,399,361. Burritt Lacy and Wilbie Hinegardner to E. I. du Pont de Nemours & Co.

Preparing racemic alpha-hydroxy-beta, beta-dimethyl-gammabutyrolactone. No. 2,399,362. Elmer Lawson and Hervey Parke to Parke, Davis & Co.

Making styrene which comprises passing phenyl methyl carbinol over mechanically strong, pelleted titania catalyst having pellet size not greater than 3/16 inch and thereafter brought into contact with strong mineral acid to activate, etc. No. 2,399,395. Leland Shriver to Carbide & Carbon Chemicals Corp.

Aromatic sulphonic acids in which nuclear hydrogen atom is substituted by radical of formula —O—R, wherein R stands for alkylated benzyl radical, which products in form of alkali metal salts are solid to liquid substances soluble in water to form stable capillary active solutions. No. 2,399,434. Charles Graenacher and Jost Frei and Jules Meyer to Society of Chemical Industry in Basle.

Alpha - (N - bis(beta-acetoxyethyl) aminomethyl) benzyl acetate. No. 2,399,479. William Emerson to Monsanto Chemical Co.

Halo-addition of hydrocarbons having unsaturated linkage of aliphatic character and partially halo-genated unsaturated derivatives thereof, with reagent comprising adsorptive alumina predominating in gamma alumina and alpha-alumina monohydrate, and solid metal halide of variable valence. No. 2,399,488. George Hearne to Shell Development Co.

Aminoalkanols of arylacetic acids. No. 2,399,506. John Pierce.

Production of monohaloalkanes which comprises reacting lower boiling tertiary monohaloalkane with mono-olefin in presence of sulfuric acid catalyst. No. 2,399,512. Louis Schmerling to Universal Oil Products Co.

Purifying colored light oil styrene fraction contaminated with acetylene and containing color imparting material normally associated with styrene in light oil fraction which comprises vaporizing, contacting vapors in admixture with hydrogen with heated hydrogenation catalyst. No. 2,399,514. Edward Smoker to The United Gas Improvement Co.

Removing higher alcohols and other impurities from crude soap stock and recovering saponifiable acid content thereof in purified form. No. 2,399,588. Bonheur Weston and Frank Beall to Aristo Corp.

Manufacturing alpha-acetoxypropionic acid which comprises heating mixture of lactic acid and excess of acetic acid in presence of catalyst. No. 2,399,595. Edward Filachione and Charles Fisher to the Secretary of Agriculture of the United States of America.

3-Ureido-1,2,4-triazoles and their preparation. No. 2,399,598. Donald Kaiser to American Cyanamid Co.

5-Ureido-1,2,4-oxadiazoles and their preparation. No. 2,399,599. Donald Kaiser to American Cyanamid Co.

Di-substituted 4,4'-diaminodiphenyl sulphones and process of making same. No. 2,399,600. Lucas Kyrides to Monsanto Chemical Co.

Substituted imidazoles. No. 2,399,601. Lucas Kyrides and Ferdinand Zienty to Monsanto Chemical Co.

Removing sodium vanillate from alkaline solution in butyl alcohol which comprises eluting solvent with weak aqueous solution containing caustic alkali. No. 2,399,607. Richard Servis to Marathon Corp.

Substituted diphenyl acetate compounds and methods for preparing same. No. 2,398,410. Lee Cheney and William Bywater to Parke, Davis & Co.

Organic selenium and tellurium compounds. No. 2,398,414. George Denison, Jr. and Paul Condit to California Research Corp.

Substituting a nuclear hydrogen of quinone by organic radical which comprises decomposing with liberation of carbon dioxide a carboxylic acid compound from peroxides and tetravalent lead compounds of carboxylic acids in presence of a quinone having unsubstituted hydrogen in quinonoid ring. No. 2,398,418. Louis Fieser.

Hydrolysis of halogen containing compounds. No. 2,398,430. Robert Joyce, Jr. to E. I. du Pont de Nemours & Co.

Synthesis of normally liquid hydrocarbons from mixture of carbon monoxide and hydrogen, which comprises passing mixture over carrier catalyst obtained by pretreating carrier material with acids to remove soluble constituents and combining acid-treated carrier material with iron group metal compounds precipitated from salt solutions with alkaline precipitants. No. 2,398,462. Otto Roelen and Walter Feisst.

Treating pure liquid butadiene to prevent polymerization thereof which comprises incorporating inhibitor consisting of ammonia to prevent polymerization upon transportation or storage over extended period of time. No. 2,398,468. Walter Schulze and Graham Short to Phillips Petroleum Co.

Reacting unsaturated organic compounds with hydrogen sulphide to produce addition compounds of mercaptans and thio-ethers, steps of contacting organic compound containing unsaturated linkage between two carbon atoms with hydrogen sulphide, maintaining 25° C., and subjecting reactants to ultra-violet rays having wavelengths of below 3000 Angstrom units. No. 2,398,479. William Vaughan and Frederick Rust to Shell Development Co.

Production of halogenated mercaptans and thio-ethers. No. 2,398,480. William Vaughan and Frederick Rust to Shell Development Co.

Effecting reactions via abnormal addition, steps of reacting compound containing unsaturated linkage between two carbon atoms having dissimilar number of hydrogen atoms, with hydrogen halide in presence of carbonylic compound from ketones, aldehydes and acid halides and effecting reaction photo-chemically under radiations above 3000 Angstrom units. No. 2,398,481. William Vaughan and Frederick Rust to Shell Development Co.

Mono-fluoro-dichloro-styrene and manufacture of the same. No. 2,398,483. Viktor Weinmayr to E. I. du Pont de Nemours & Co.

Purifying aliphatic dicarboxylic acid of 16 carbon atoms having corrosion inhibiting power and containing dispersed a metal compound having adverse effect on this power, comprising dissolving acid in neutral organic solvent, blowing solution with inert gas. No. 2,398,485. Norman Wilson to Shell Development Co.

Refining low-grade fat, which comprises esterifying free acid components by treatment with dialkyl sulfate not higher than diethyl sulfate, in presence of acid absorbing agent to neutralize mineral acid liberated by esterification process. No. 2,398,492. George Bradshaw and Walter Meuly to E. I. du Pont de Nemours & Co.

Separating pure paraxylene from hydrocarbon oil containing more than 16% paraxylene and other close-boiling hydrocarbons, comprises cooling mixture of hydrocarbon oil and alkanol of not more than 2 carbon atoms to solidify part of hydrocarbon mixture, fractionally melting solid hydrocarbon mixture and removing liquid phase material formed by fractional melting. No. 2,398,526. Richard Greenburg to Allied Chemical & Dye Corp.

Alpha, alpha-bis- (beta'-halogenalkyl)-arylaceto-nitriles. No. 2,398,575. Franz Bergel, Nathan Hindley, Alexander Morrison and Heinrich Rinderknecht to Roche Products Ltd.

1,3-dichloro-5-methyl-5-isobutyl hydantoin. No. 2,398,598. Arthur Rogers to E. I. du Pont de Nemours & Co.

Dichloro-1,1'-methylene-bis - (5,5 - dialkyl hydantoin). No. 2,398,599. Arthur Rogers to E. I. du Pont de Nemours & Co.

Production of carbonylic compounds wherein hydro-carbon is subjected to action of oxygen, improvement which comprises contacting reaction mixture with peroxide-inactivating catalyst comprising silicon carbide porous aggregates. No. 2,398,612. Ingolfur Bergsteinsson, James Scheibli and Frank Dickey to Shell Development Co.

Preparing acyclic monoketones from normal butylene which comprises reacting butylene with oxygen-containing mercuric salt in aqueous solution of sulfuric acid. No. 2,398,685. Harry Yale and George Hearne to Shell Development Co.

Producing free tar-acids from cresylic pitch residue that is non-distillable without excessive decomposition and coking. No. 2,398,687. Charles Winans to Koppers Co. Inc.

Separating styrene from mixture with close-boiling aromatic hydrocarbons selected from ethyl benzene and xylenes wherein mixture is subjected to a binary azeotropic distillation in presence of entrainer comprising ethylene glucol lower alkyl ether. No. 2,398,689. Ward Bloomer to The Lummus Co.

Compound selected from disemicarbazone of methyl 3-benzoxy-7, 12-diketocholanate, the semicarbazone of ethyl 3-benzoxy-7-keto-12-hydroxy-cholanate, etc. No. 2,398,709. Willard Hoehn and Alexander Schneider to George A. Breon & Co.

An (alkoxymethoxy) acetonitrile having formula $ROCH_2OCH_2CN$. No. 2,398,757. Donald Loder and Walter Bruner to E. I. du Pont de Nemours & Co.

Chlorinated polythenes containing 60 to 75% by weight of chlorine which are soluble in cold carbon tetra-chloride and have tensile strength above 400 kilograms per square centimeter. No. 2,398,803. James Myles and Francis Jones to Imperial Chemical Industries Ltd.

Refining diolefinic hydrocarbon material contaminated with impurity including acetylenic material comprising passing material through dispersion of finely divided metal selected from metals of group Ia and group IIa. No. 2,398,810. Frank Soday to The United Gas Improvement Co.

Production of vinyl acetate which comprises reacting acetylene with acetic acid in presence of compounds of group of zinc and cadmium supported on Activated Alumina. No. 2,398,820. Philip Coppock and David Hadley to The Distillers Co. Ltd.

Production of butyl alcohol and acetone from uninverted molasses mash, which consists in treating culture of Clostridium madisonii, etc. No. 2,398,837. Elizabeth McCoy to Wisconsin Alumni Research Foundation.

Lactones of the saturated and unsaturated cyclopentanopolyhydrophenanthrene series and process of preparing same. No. 2,398,861. Leopold Ruzicka to Ciba Pharmaceutical Products, Inc.

Manufacture of alpha-chloro-acrylic acid which comprises oxidising alpha-chloro-acrolein dissolved in inert solvent by action of molecular oxygen in contact with solution. No. 2,398,867. Hanns Staudinger and Karl Tuerck to The Distillers Co. Ltd.

Separating butadiene from mixtures of butadiene and more saturated hydrocarbons. No. 2,398,930. Wright Gary to Filtrol Corp.

Additional patents on all other classifications from the above volumes will be given next month.

Abstracts of Canadian Patents

Collected from Original Sources and Edited

Requests for further information or photostated copies of the patents reported below should be addressed to the Commissioner of Patents and Copyrights, Department Secretary of State, Ottawa, Canada.

CANADIAN PATENTS

Granted and Published March 19, 1946

Insecticide comprising a phenoxazine dispersed in a dust carrier. No. 433,692. General Chemical Company. (William A. Knapp)

Improved process for preparing gel type plural oxide catalysts of definite composition. No. 433,717. The Standard Oil Co. (Robert E. Burk)

Granted and Published March 26, 1946

Production of oxygenated organic compounds by mixing one volume of a gaseous unsaturated aliphatic hydrocarbon with about 7 volumes of air and adding 50 volumes of anhydrous unreacted gaseous unsaturated aliphatic hydrocarbon recycle and heating. No. 433,742. Camille Dreyfus.

Sliding contact comprising a pressed mixture of powdered iron, graphite and colloidal carbon, said collodial carbon constituting less than ten per cent of the iron. No. 433,746. Josef Friedrich Heuberger.

Producing a growth promoting substance by condensing a lactone with beta-alanine ester and subsequent hydrolysis of the ester linkage. No. 433,750. Herschel K. Mitchell.

Insecticide containing as its essential active ingredient α, α, β-trichloropropionitrile. No. 433,762. American Cyanamid Company. (Bryan C. Redmon)

Dehydrogenating hydrocarbons by subjecting the hydrocarbons to dehydrogenating conditions in the presence of a catalyst comprising a major proportion of Al_2O_3 and minor proportions of Cr_2O_3 an alkaline earth metal oxide and copper. No. 433,767. The Atlantic Refining Company. (Frank L. Gaus)

Manufacture of melamine by fusing cyanamide or dicyandiamide in the presence of the salts of guanidine, biguanide. No. 433,773. British Industrial Plastics Ltd. (Alfred Brookes)

Resinous composition comprising a decarboxylated glycol mono-maleate. No. 433,775. Canadian General Electric Company, Ltd. (Maynard C. Agens)

Physically strong granules of crystalline urea, ranging in size from 0.131 to 0.0164 inch in diameter, and containing from 1 to 3 per cent by weight of starch based on the weight of urea, and method of manufacture. No. 433,778. Canadian Industries Ltd. (Edward Frederick Harford)

Production of 1:2-dihydropyran by subjecting tetrahydrofurfuryl alcohol in the vapor phase between 200° C. and 500° C. to the action of a catalyst consisting of a mixture of alumina and aluminum phosphate. No. 433,779. Canadian Industries Ltd. (John George Mackay Bremner and Donald McNeil)

Condensation product of N,N'—bis(methoxy-methyl) uron with a hydroxylated polymer having a cellulosic nucleus and hydroxyls thereon, substantially insoluble in solvents for the untreated hydroxylated polymer. No. 433,783. Canadian Industries Ltd. (Robert William Maxwell)

Rubber having incorporated therein 25 per cent to 2.5 per cent of N,N'-diphenyl-benzidine and 75 per cent to 97.5 per cent of N-(para-tolyl)-beta-naphthylamine. No. 433,784. Canadian Industries Ltd. (Arthur Morrill Neal and John Richard Vincent)

Dry reducing composition comprising formamidine-sulphinic acid, a photographic developing agent and a water soluble alkaline sulphite. No. 433,785. Canadian Industries Ltd. (John Rau Weber)

Rubber antioxidant composition comprising a mixture of 1 part of secondary aromatic amine antioxidant and from about 0.01 to about 2 parts of zinc pinene mercaptide. No. 433,786. Canadian Industries Ltd. (John Richard Vincent)

Recovery of glycerine from glycerine-containing aqueous solutions by forming a mixture of the aqueous solution with a solution with a solvent for glycerine and heating to distil off the water in admixture with the solvent and to leave a substantially water-free solution of glycerine in the solvent. No. 433,803. The Distillers Company, Ltd. (Eric Harvey Brittain, Walter Philip Joshua and John Marshall Whitmarsh)

Manufacture of ethyl-(1-methylbutyl)-thiobarbituric acid and salts by condensing thiourea with ethyl-(1-methylbutyl)-ethyl cyanoacetate and hydrolyzing the imide thus formed. No. 433,831. May & Baker Ltd. (John Arthur Kemp)

Flexible transparent adhesive tape or sheet which is weatherproof and stretchy to the extent of at least 25 per cent, adapted for use in surface outdoor signs. No. 433,833. Minnesota Mining & Manufacturing Co. (Philip V. Palmquist)

Fat-soluble vitamin-containing substance stabilized against oxidation by the presence therein on a natural antioxidant concentrate. No. 433,835. National Oil Products Co. (Loran Oid Buxton)

Production of artificial filaments by shaping a solution of a polymerized mixture of a vinyl halide and a vinyl ester of an aliphatic acid in a mixture of acetone and dimethyl-cyclohexanol oxalate and setting the shaped materials by evaporation of solvent. No. 433,860. Claude George Bonard. (Robert Pierce Roberts and Edgar Bert Johnson)

Granted and Published April 2, 1946

Electrical precipitator for minute dust particles. No. 433,900. Canadian Westinghouse Company. (Gaylord W. Penney)

High temperature oxidizing catalyst capable of oxidizing completely carbon monoxide at temperatures as low as 200 degrees Centigrade comprising a mixture of finely divided platinum and palladium and a minor proportion of an oxide of cobalt. No. 433,912. Carbon Monoxide Eliminator Corp. (Owen Glendower Bennett and Alfred Christian Van Andel)

Improved method for the electrolysis of magnesium chloride fusions No. 433,916. The Consolidated Mining and Smelting Company. (Robert B. MacMullin)

Treating textile material with a compound having the formula $R \cdot N{=}C{=}O$ where R is an aliphatic radical containing at least ten carbon atoms, and heating the impregnated textile material to 100° C. to render water-repellent. No. 433,930. Heberlein Patent Corp. (Walter Kaase and Ernst Waltmann)

Preparing thiazole derivatives by reacting a salt of vitamin B_1 with a soluble sulphite and separating the resulting thiazole derivative from the reaction mixture. No. 433,943. Research Corporation. (Robert R. Williams)

The method of making thiazole compounds which comprises condensing thioformamide with a compound having the formula $CH_2COCHXR$, in which X represents one of the halogens bromine, chlorine and iodine and R is the group CH_2CH_2OH or a group which can be converted into or replaced by CH_2CH_2OH. No. 433,944. Research Corporation. (Edwin R. Buchman)

Hair dyeing composition comprising water soluble organic dye and a water-soluble amide. No. 433,945. Rit Products Corporation. (Wolf Kritchevsky)

Finely pulverulent agent for improving flour which contains l-ascorbic acid. No. 433,979. Pieter Reinier Antonius Maltha.

Granted and Published April 9, 1946

Self-sealing fuel tank design. No. 413,359. The B. F. Goodrich Co. (Richard Andrew Crawford). Withheld from publication on 22nd of June, 1943.

Hard self-luminous material produced by mixing luminous paint powder with granulated polymerized methacrylate to melt and blend and then chilling. No. 433,993. Cyril Arthur LeBeau.

Hydrogen sulfide process for separating calcium values from magnesium in oxide mixtures. No. 434,012. George E. Walker.

Manufacture of 4,4'-derivative of 2-carboxydiphenylsulfone and ester. No. 434,016. American Cyanamid Co. (George W. Anderson).

Preparing bases of biguanide, and guanylurea from their salts reacting these salts with a solution of sodium in an alipathic alcohol having not more than four carbon atoms. No. 434,017. American Cyanamid Co. (Robert P. Parker).

Medicinal preparation containing as the essential ingredients 3 per cent 2-sulphanilamidopyrimidine, 8 per cent triethanolamine and 5 per cent of a water soluble dimethyl cellulose ether. No. 434,019. American Cyanamid Co. (James K. Dixon and Russell L. Morgan).

Anaesthetic composition comprising a 1,3-dipyridyl-2-alkylol guanidine. No. 434,020. American Cyanamid Co. (Walter P. Ericks and James H. Williams).

Therapeutic agent effective in the treatment of intestinal diseases including dysentry comprising 2-sulphanilamidothiazole-5-carboxylic acid. No. 434,026. American Cyanamid Co. (Harry W. Marson).

Producing an improved asphalt of reduced staining tendency from flux asphalt by adding to the flux asphalt from 0.1 per cent to 5 per cent by weight of aluminum stearate and subjecting the mixture to air blowing at elevated temperature. No. 434,027. The Atlantic Refining Co. (Arthur B. Hersberger).

Electrolyte for use in the anodic polishing of copper containing from 75 to 84 per cent by weight orthophosphoric acid and from 0.25 to 2 per cent trivalent aluminum, the balance water. No. 434,030. Battelle Memorial Institute. (Charles L. Faust).

Resinous condensation product of ingredients comprising an aldehyde and an aliphatic ester of bis-(diamino s-triazinyl thio) acetic acid. No. 434,047. Canadian General Electric Co., Ltd. (Gaetano F. D'Alelio and James W. Underwood).

Treating aqueous media to remove cations therefrom by percolating through a cation-exchange material which is the infusible reaction product of one mol phenol, about two mols of a mixture of formaldehyde and furfural, and from one-third to three-fourths mol nitrourea. No. 434,048. Canadian Electric Co., Ltd. (Gaetano F. D'Alelio).

Process for making gamma substituted propyl naphthoquinones. No. 434,076. Merck & Co., Inc. (Max Tishler).

Oxidation process for the production of diacetone keto gulonic acid. No. 434,077. Merck & Co. (John Weijlard and John B. Ziegler, Jr.).

Making a methyl-4-amino-1-naphthol from a 1,4-naphthoquinone having a methyl group in the 2 or 3 position. No. 434,079. Parke, Davis & Co. (Wilbur F. Kamm and Benjamin E. Tullar).

De-icing fluid comprising approximately 35 parts by volume of ethylene glycol, 55 parts secondary butyl alcohol, 10 parts water and small proportions of β-naphthol and sodium nitrate. No. 434,085. Shell Development Co. (Dudley Herbert Japes).

As a composition of matter a crystalline compound consisting of carbonates, bicarbonates, tartrates, and phosphates, having an interstitial coating containing a fatty acid, and characterized by a retarded reaction rate throughout the reaction period. No. 434,087. Standard Brands Inc. (William E. Stokes and William E. Barch).

Insulating composition for coating metal comprising waterglass and calcined dolomite. No. 434,105. John Urquhart Birnie. (Edward Roach).

Chromable dyestuff. No. 434,109. I. G. Farbenindustrie Aktiengesellschaft. (Wilhelm Eckert and Karl Schilling).

Anti-acid composition comprising a mixture of calcium caseinate and calcium carbonate. No. 434,113. Werner L. Lipschitz.

(*To be continued*)

Trademarks of the Month

A Checklist of Chemical and Chemical Specialties Trademarks

420,524. The Eagle-Picher Lead Co., Cincinnati, Ohio; filed July 19, 1944; Serial No. 472,379; for plastic cement; since July 13, 1944.

420,526. Harry V. Nelson, as H. V. Nelson & Co., Charlotte, N. C.; filed Oct. 11, 1944; Serial No. 475,219; for liquid and paste wax; since Sept. 1, 1936.

420,535. Wesco Waterpaints, Inc., Berkeley, Calif.; filed Dec. 16, 1944; Serial No. 477,675; for paints in powder; since Nov. 15, 1944.

420,549. Leon Diamond, as Swiss Lab., Cleveland, Ohio; filed Aug. 14, 1945; Serial No. 487,117; for synthetic enamel, lacquer, etc.; since Jan. 10, 1940.

420,658. Joubert Cie, Inc., N. Y.; filed Jan. 3, 1945; Serial No. 478,179; for insect repellents; since Dec. 4, 1944.

420,665. Joseph Triner Corp., Chicago, Ill.; filed Sept. 13, 1945; Serial No. 488,437; for insecticide; since June 4, 1923.

420,926. Babbitt Industrial Specialties Co., New Bedford, Mass., by Change of name Babbitt Chemical Specialties Co.; filed Apr. 4, 1944; Serial No. 468,994; for plastic coating as covering for articles during shipping; since Feb. 5, 1944.

420,971. Hockwald Chemical Co., San Francisco, Calif.; filed Nov. 2, 1945; Serial No. 190,945; for insecticides in powdered and liquid form; since 1920.

459,883. Joseph G. Nathanson, as Soluol Chemical Co., East Greenwich, R. I.; filed Apr. 14, 1943; for water repellant finish treatment of textile fibres; since Mar. 5, 1942.

467,823. Archie T. Stratton, as Automotive Products Distributor, Ltd., Cleveland, Ohio; filed Feb. 28, 1944; for lubricating oil for addition to gasoline to prevent sticking valves; since May 2, 1942.

471,640. A. O. Smith Corp., Milwaukee, Wis.; filed June 24, 1944; for industrial processing pressure and vacuum vessels; since Nov. 28, 1941.

477,466. Foundry Rubber Compounds Corp., Washington, D. C.; filed Dec. 12, 1944; for thinner for paints, lacquers; since July 14, 1944.

477,990. American Aniline Products, Inc., N. Y.; filed Dec. 28, 1944; for vat dyes for printing rayons; since Dec. 15, 1944.

480,885. American Aniline Products, Inc., N. Y.; filed Mar. 14, 1945; for dyestuffs; since Jan. 19, 1945.

484,510. Paul Unger, Chicago, Ill.; filed June 13, 1945; for water paint; since Apr. 23, 1945.

485,167. L. Sonneborn Sons, Inc., N. Y.; filed June 28, 1945; for heavy white mineral oil sold in bulk; since June 15, 1927.

485,951. Haas-Miller Corp., Philadelphia, Pa.; filed July 18, 1945; for liquid detergent for scouring wool; since Mar. 5, 1936.

487,222. United States Quarry Tile Co., Canton and East Sparta, Ohio, and Parkersburg, W. Va.; filed Aug. 17, 1945; for abrasive balls and pebbles as used in ball mills; since July 21, 1945.

487,228. United States Quarry Tile Co., Canton and East Sparta, Ohio, and Parkersburg, W. Va.; filed Aug. 17, 1945; for mortars, pestles, crucibles, etc.; since July 21, 1945.

487,504. Continental Distributors, Inc., Washington, D. C.; filed Aug. 24, 1945; for insecticides; since Aug. 16, 1945.

488,281. Nuodex Products Co., Inc., Elizabeth, N. J.; filed Sept. 11, 1945; for driers, dispersing, bodying and stabilizing agents for linoleum and oiled cloth; since 1937.

488,285. Roxalin Flexible Finishes, Inc., Elizabeth, N. J.; filed Sept. 11, 1945; for primers and paints; since June 28, 1945.

488,356. Maas & Waldstein Co., Newark, N. J.; filed Sept. 12, 1945; for plating-rack enamels; since Aug. 14, 1945.

488,484. James E. Smith as Jeps Products Co., Philadelphia, Pa.; filed Sept. 14, 1945; for metal polish and cleaner; since Aug. 1, 1945.

488,782. The Selig Co., Atlanta, Ga.; filed Sept. 20, 1945; for resin finish for concrete floors; since May 22, 1936.

488,866. Resistoflex Corp., Belleville, N. J.; filed Sept. 22, 1945; for extruded and molded sheets of compar (compounded polyvinyl alcohol); since June 25, 1945.

489,150. Saverite Eng. Co., Los Angeles, Calif.; filed Sept. 28, 1945; for paint for interior of boilers and tanks; since April 1939.

489,426. United States Quarry Tile Co., Canton and East Sparta, Ohio; filed Oct. 4, 1945; for pestles and vessels for laboratory use; since January 1943.

489,739. Roy H. Jenkins, as Bluvox Co., Los Angeles, Calif.; filed Oct. 10, 1945; for polish; since July 11, 1933.

489,795. Colgate-Palmolive-Peet Co., Jersey City, N. J.; filed Oct. 11, 1945; for aluminum phosphate; since Sept. 11, 1945.

490,190. Hercules Powder Co., Wilmington, Del.; filed Oct. 19, 1945; for dynamite; since Oct. 11, 1945.

490,382. Karl H. Huppert, Chicago, Ill.; filed Oct. 23, 1945; for laboratory electric furnace; since Apr. 1, 1945.

491,076. Philip Fleischman, N. Y.; filed Nov. 5, 1945; for tetrasodium pyrophosphate; since Oct. 15, 1945.

491,556. Dodge & Olcott, Inc., N. Y.; filed Nov. 14, 1945; for insecticides; since Feb. 27, 1945.

491,563. The B. F. Goodrich Co., as B. F. Goodrich Chemical Co., a Division of The B. F. Goodrich Co., N. Y., and Akron, Ohio; filed Nov. 14, 1945; for rubber chemicals; since Aug. 24, 1945.

491,694. West Virginia Pulp & Paper Co., N. Y.; filed Nov. 15, 1945; for abietic acid; since Oct. 22, 1945.

491,772. The Procter & Gamble Co., Cincinnati, Ohio; filed Nov. 17, 1945; for sudsing cleaner; since Oct. 31, 1945.

491,800. The Babcock & Wilcox Co., N. Y.; filed Nov. 19, 1945; for chemical recovery furnaces, etc.; since December 1935.

491,957. Atlantic Refining Co., Philadelphia, Pa.; filed Nov. 21, 1945; for liquid dry cleaner; since Aug. 28, 1944.

492,005. Soil-Off Mfg. Co., Glendale, Calif.; filed Nov. 21, 1945; for non-inflammable liquid paint cleaner; since Oct. 20, 1945.

492,351. The Beacon Co., Boston, Mass.; filed Nov. 29, 1945; for floor wax, since 1926.

492,361. The Curran Corp., Malden, Mass.; filed Nov. 29, 1945; for self-emulsifying colloidal detergent solvent; since Feb. 10, 1932.

493,341. General Dyestuff Corp., N. Y.; filed Dec. 15, 1945; for dyestuffs; since Nov. 30, 1945.

493,358. International Lubricant Corp., Southport, La.; filed Dec. 15, 1945; for insecticides and aluminum stearate; since March 1937.

494,063. Graton & Knight Co., Worcester, Mass.; filed Dec. 29, 1945; for adhesive belt cement; since 1902.

Trademarks reproduced and described include those appearing in Official Gazette of U. S. Patent Office, April 16-May 7.

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